The IRON AGE

Vol. 159, No. 6 February 6, 1947

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Sobriety for the Nondurables

MERCHANTS close to the almighty consumer are rubbing their lamps with a kind of desperate vigor. The beautiful yellow gold seems to be wearing down to base metal in spots. Each day the lamps look more like utilitarian lights with which to beckon customers rather than Aladdin's miraculous vessel of wealth. Not that the cash registers still aren't ringing bravely—but there are just enough fitful pauses to give rise to a certain amount of introspection.

The vice-president of W. T. Grant Co., at a recent meeting of the ubiquitous National Retail Dry Goods Association, pointed out that some crackups have already appeared, and stated that the retail industry is suffering from a four-and-a-half year binge during which it has broken every known economic law. Then, with sober perspicacity, the president of the association at the same meeting proposed that retailers take it upon themselves to militantly defend "free enterprise"; that it is no longer sufficient for retailers to sell merchandise, but the real job today is to sell the American system along with their products. As usual, an aggressive public relations program is to be directed toward that end.

The objective is praiseworthy, but on occasion it seems almost as if free enterprise has too many heated defenders and aggressive public relations programs merchandising the American system as if it were a new cosmetic. A somewhat more realistic approach to the problem seems to be contained in a later survey by the same association. Probing the thinking of consumers, the survey brought forth the astounding conclusion that the average customer wanted merchandise at fair and reasonable price levels—that men wanted shirts at $2.50 and boys' shoes at $6. That seems like a rather modest challenge to free enterprise!

The nondurables had pretty much of a field day last year. But in this year of 1947, while the retailer is militantly selling his free enterprise and $2.50 shirts, he'll discover that the durables have finally squared away to capture their prewar share of what's left of the consumer dollar. Just how much is left is somewhat debatable—surprisingly enough, the consumer already seems to be pretty heavily in hock notwithstanding all the talk of potential purchasing power dammed up in war bonds. Consumer credit accounts are nearing the 1941 dollar peak and charge accounts are reaching for new highs. With installment credit for automobiles and other durable goods now only one-fourth to one-eighth prewar normal, it looks as if some shifts in buying patterns are in prospect accompanied by some rather lively competition.

The year 1946 went to the nondurables in default and the pickings were lush indeed. But 1947 will be the year of durables and the pickings may be equally lush. The pattern of price level and consumer resistance, however, is just as inexorable whether the product is a man's shirt or a family's automobile.

T. W. Lippert

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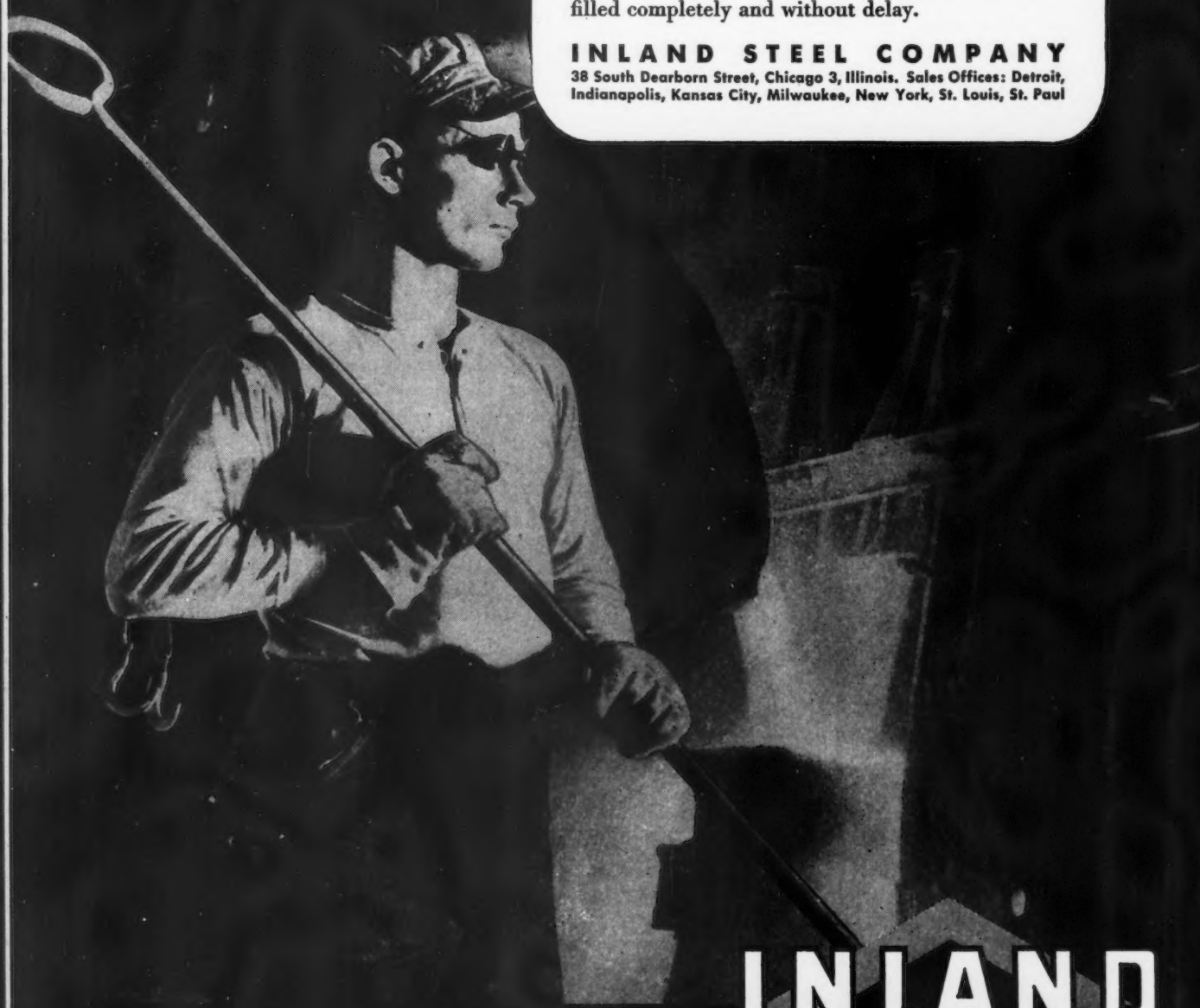

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INLAND STEEL

IRON AGE — NEWSFRONT —

February 4, 1947

► The steel industry's basing point system is undergoing some refinements that may, in their total, change the entire economy of the industry. Companies are carefully scrutinizing their own and their competitors' basing points and selling on them only the directly competitive grades, sizes, finishes and specifications of given products.

► Interest in the possibilities of the Sendzimir cluster mill for rolling work-hardening materials is showing a substantial increase. Orders for these mills have risen sharply over the past 12 months and cover applications for nonferrous materials as well as for stainless steel. The newest installation will be at Washington Steel Corp. and is expected to be operating soon on stainless.

► Before the war, two out of three people bought a used car rather than a new one. Recent surveys show that today one new car is being sold for every used car. This ratio is expected to continue for several years at least.

► A recently completed electric motor test program indicates that silicone insulated motors will last about 900 times as long as Class B motors. These tests, conducted over the past 3 years, were accelerated life tests. One of the test series showed a life of 3760 hr at 390°F for a Class B motor, as compared with 5178 hr at 570°F for a silicone insulated motor.

► Because of the current shortage and high price of manganese, some steel companies are taking what would normally be uneconomical steps to recover manganese. In Detroit, Ford is running all its openhearth slag through the blast furnace merely to recover approximately 0.30 pct Mn.

► Evolved in the frenzy of wartime expedients, the practice of photographically reproducing exact engineering layouts upon the actual metal fabricated into the parts of an experimental airplane, promises to have interesting possibilities in other manufacturing processes. Particularly on experimental or short run work, the saving in time and money by the elimination of templates or patterns is significant.

► A new silicone-base heat-resistant baking enamel is reported to be able to withstand temperatures of more than 500° F without yellowing. Available in various colors it is said to have unusual affinity for aluminum and to cost less than other finishes within the same range of heat resistance.

► General Motors has been buying about 10,000 tons of pig iron a month from U. S. Steel at Geneva, Utah, paying about half the cost of the pig iron as freight. In addition, GM has brought 3000 tons of pig from Mexico, 10,000 tons from Sweden and an equal amount from England.

► The international executive board of the UAW-CIO has levied a $1 assessment, as of Feb. 1, 1947, on all members to assist particularly in the J. I. Case and Allis-Chalmers strikes. More than $100,000 per month is being paid from this fund to striking UAW-CIO locals.

► Hailed as one of the most significant advances in compass design since the invention of the magnetic needle is a new electron gun compass no larger than a flashlight. The device contains no moving parts but depends upon a constant bombardment of electrons aimed at a target to provide direction signals and guide a ship or plane on a preset course.

► Five blast furnaces are now using the MacIntyre magnetic concentrates produced by National Lead at Tahawus, N.Y. Four of these furnaces are using the sintered concentrates. Several other blast furnace operators are reportedly experimenting with this low phosphorus iron ore.

► Possibly indicating that similar negotiations with Sweden have ended unsuccessfully, Italian steel interests are reported to be soliciting financial support from Britain. British Treasury will probably take the attitude that fostering the reconstruction of the Italian steel industry by releasing funds for this purpose would only intensify competition in the export fields in which Britain is so interested.

The important requirement for scrap for the Italian industry would probably also render difficult any firm agreement with Britain, inasmuch as it seems likely that these two countries would be competing keenly for any scrap available in the world market.

Hot Rolling Iron-Carbon Alloys

In an effort to determine the feasibility of producing piston rings from rolled cast iron, a series of investigations were conducted in Germany to establish the effect of various factors on the hot rolling of high test iron. The results of these extensive tests are summarized in this two-part article. In this, the first part, the authors review the literature and discuss the influence of chemical composition, initial structure, thermal condition and rate of reduction.

By E. PIWOWARSKY and A. WITTMOSER

Foundry Institute,
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IT is generally acknowledged by both foundrymen and users that high duty cast iron possesses characteristics such as high damping capacity, low notch sensitivity and good corrosion and wear-resisting properties which will insure its employment for an ever widening range of uses in the course of the next few decades. A still wider field would, however, become opened up to this class of cast iron if it could be made capable of plastic deformation and as a result sustain a marked improvement in both static and dynamic properties, as has proved feasible with almost all other industrial alloys.

Judging from the recent literature, the prospects of realizing a mechanical shaping of cast iron do not appear by any means dim. Not all foundrymen will be prepared to share this view, since the apparent inability of cast iron to respond to hot and cold working is still frequently given as one of the main distinctions between it and steel, and is indeed regarded as on a par with the difference in carbon content. It is thus found that the Werkstoffhandbuch Stahl und Eisen[1] states that a carbon content of 1.7 pct roughly corresponds to the upper limit of forgeability, while R. Stotz[2] suggests that malleable iron also cannot be hot worked to any considerable extent. Moreover, he considers this material forgeable only in highly decarburized, thin sections.

In this connection it may be noted that F. R. Bonte and M. Fleischmann[3] suggest the intentional production of a black-fracture steel with 1.6 pct and 1.2 pct Si with the object of combining in one material the most desirable properties of both annealed steel and cast iron. The dividing line between "annealed wrought steel" and "forged and rolled cast iron" is thus seen not to be very sharp.

Further, Ingberg and Sale[4] on plotting stress-strain curves from compression tests on cast iron over a temperature range from 70°F to 1395°F, found that the characteristics of the curves indicate a transition from a state of brittleness to one of incipient plasticity as the temperature is raised. This may already be construed as pointing to the possibility that cast iron can be successfully hot-rolled. Also, from investigations on the shrinkage of cast iron, Girault[5] concluded that cast iron could be forged at temperatures between 1112°F and 1650°F, especially above 1290°F.

The fact that cast iron can be successfully hot-worked and the technical significance of this were first recognized in all its implications by H. Nipper and E. Piwowarsky. In his patent specification of 1932[6], H.

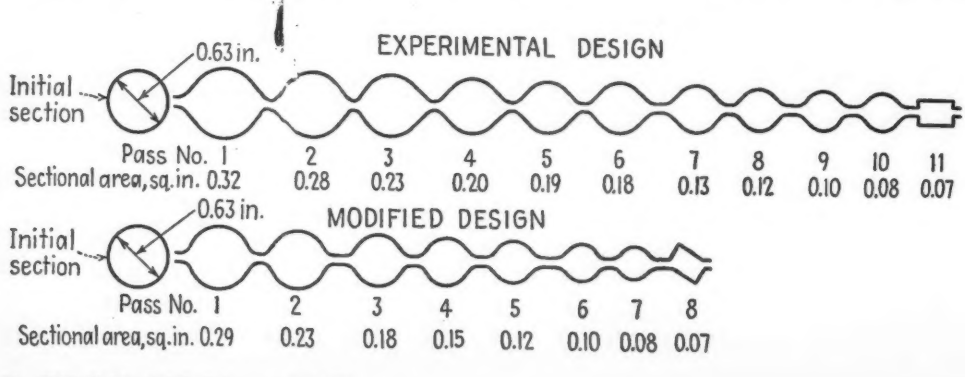

EXPERIMENTAL DESIGN
0.63 in.
Initial section
Pass No. 1 2 3 4 5 6 7 8 9 10 11
Sectional area, sq.in. 0.32 0.28 0.23 0.20 0.19 0.18 0.13 0.12 0.10 0.08 0.07
MODIFIED DESIGN
0.63 in.
Initial section
Pass No. 1 2 3 4 5 6 7 8
Sectional area, sq.in. 0.29 0.23 0.18 0.15 0.12 0.10 0.08 0.07

FIG. 1 — Roll designs for rolling cast iron. Top view is the experimental design; lower sketch shows a modified form.

Nipper enumerated the host of applications which a new material such as "rolled cast iron" would possess. His specification covers the hot-working of all iron-carbon alloys containing more than 1.7 pct C, in any structural condition and at temperatures in the range from 1740° to 2100°F. The experimental work on which this specification was based, and subsequent work by Nipper and Piwowarsky[7], have already been described. In these investigations in which white, gray and mixed irons were submitted to rolling, annealed and/or white irons were found the easiest to roll and gave the highest ultimate physicals. Rolled malleable iron gave tensile values up to 170,640 psi with low elongation values. It may be noted that the cast irons investigated were low in phosphorus, i.e. 0.05 pct.

Work on similar lines has been carried out both in the United States and Britain. D. P. Forbes[8] rolled gray and white irons between flat rolls and found that white iron bars could be rolled down to sheet gages. In his paper Forbes gives no details of the procedure by which this was achieved. He noted that hot-rolling promoted to a marked degree breakdown of the cementite, but he did not consider there was much prospect of successfully rolling the gray irons.

J. V. Murray[9] carried out some rolling experiments on pearlitic, annealed malleable irons and found that the optimum rolling temperature was around 1740°F. At this temperature the test bars could be reduced by 80 pct in cross section with one reheat in eight passes. But the tensile strength of the rolled products was only 85,300 psi.

In 1942, E. Piwowarsky[10] reviewed the progress which had been made in hot rolling of cast iron and expressed the view that rolled cast iron was in a position to provide a very useful structural material combining the mechanical properties of steel with those of graphitic cast iron. In consequence, its range of applications may be regarded as almost unlimited.

It may therefore be concluded from the literature that high-duty cast irons with different compositions and structures can be hot-rolled provided certain conditions are met. It is striking that no systematic investigations have been made to develop this potentiality, as for example, by a closer study of the influence of chemical composition, initial structure, conditions and rate of rolling, on the properties of the rolled product. Published work has been mainly limited to exploratory experiments and only the briefest indications are given of the conditions under which the material tested was rolled. The present authors' investigations, summarized in the following comments, are intended to fill the existing gaps in the knowledge of the precise effects of these variables and to demonstrate that the rolling of cast iron to be successful must satisfy certain a priori requirements in order to assure a satisfactory reproducibility in the results.

The authors' experiments were designed to establish the conditions governing the rolling of iron-carbon alloys with over 1.7 pct C. In preliminary tests, an alloy containing 2.8 pct C, 1.1 pct pct Si, 0.6 pct Mn, less than 0.03 pct S and 0.05 to 0.4 pct P had been found to respond satisfactorily to rolling. This led the authors to adopt this composition as the standard composition in their subsequent work.

The rolling variables studied were (1) the effect of initial structure, (2) the effect of rolling temperature, and (3) the effect of the speed of rolling, while the compositional variables were (a) the phosphorus content, and (b) the carbon content above 1.7 pct.

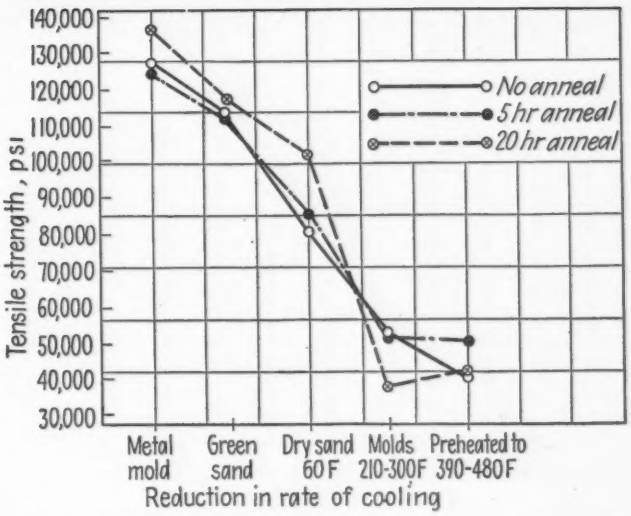


FIG. 2—Effect of rate of cooling of the mold on tensile strength.

Other factors which might have a bearing on the rolling properties were also noted in the course of this work.

Heats were prepared in a small Junkers type graphite-rod furnace, and bars measuring 16 mm (0.63 in.) in diam and 200 mm (7.8 in.) long were cast in sand and metal molds. About 40 bars were cast from each heat. The furnace was tapped with the metal at a temperature of about 2640°F, the metal at pouring being about 2460°F. Bars were X rayed to detect any shrinkage cavities and any bars found defective were discarded. Some bars from each batch were reheated in an electric furnace to eliminate casting stresses and to initiate breakdown of the cementite. The same furnace was used for reheating the bars to rolling temperature.

The bars were rolled in a pinion stand with three-stage control permitting rolling speeds to be varied from 0.5 m (19.6 in.) to 10 m (32.8 ft) per sec. The reheating furnace was located close enough to the stand to allow the rolling temperature to be taken roughly as equal to the furnace temperature.

While flat rolls had been used in previous work on cast iron, the rolls in the authors' experiments were

FIG. 3—Influence of annealing time on tensile strength of rolled cast iron bars.

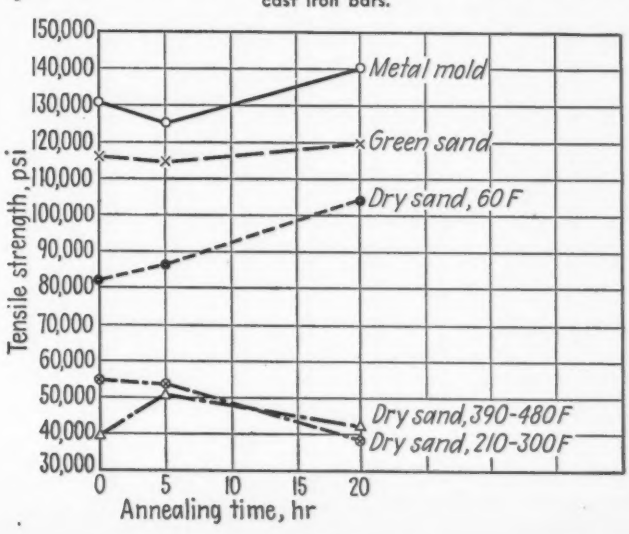


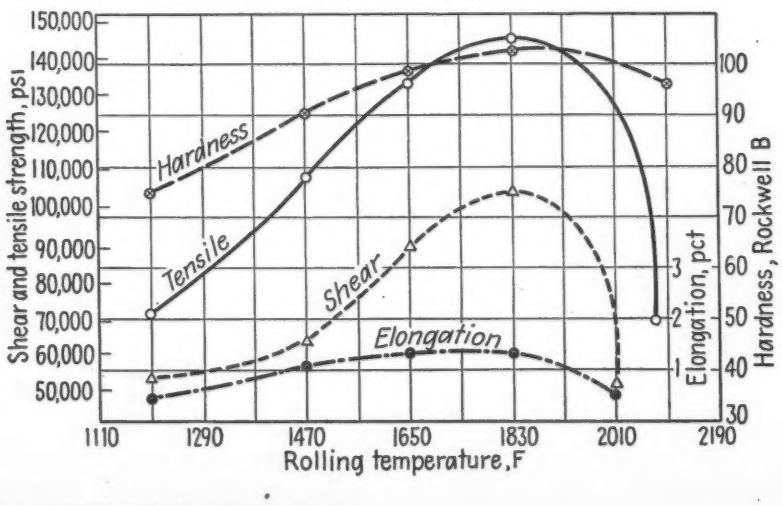
FIG. 4—Cast iron bars rolled above or below the ideal temperature will show either longitudinal splitting (left) or transverse cracks (right).

grooved. Roll barrels were 280 mm (11 in.) in diam and 300 mm (11.8 in.) wide. The first roll design was developed by Dr. F. Gruner on the basis of a roll design intended for rolling alloy steels (fig. 1, upper part). With these rolls the initial section of 16 mm (0.63 in.) diam was reduced in 11 passes to a section of 9 mm by 5 mm, (0.35 x 0.2 in.) an aggregate reduction of 78 pct.

Before rolling, the cast and partly annealed bars were reheated in the electric furnace for 30 min. After each pass the bars were returned to the furnace for a further reheat of 3 min and before each reroll given a part turn to counteract spreading between the rolls.

After rolling, each bar measured 9 mm by 5 mm, (0.35 x 0.2 in.) and 1.2 m (47.2 in.) long. Two samples were taken from each bar for etching (longitudinally and transversely), one sample for hardness tests (longitudinally), one for shear test (transversely) and four samples for tensile and elongation tests (longitudinally). At least five values were averaged in each case to obtain the required mechanical data. On the whole, 40 heats were prepared and a total of 2 metric tons of cast iron was cast into 1800 round bars and 20 flat bars.

FIG. 5—Relationship between mechanical properties and rolling temperature of iron with 0.1 pct P.



Initial Structure

To examine the effect of initial structure on the mechanical properties, five sets of test bars of similar composition were cast, and each series of bars submitted to three different heat treatments. A range of structures from pure ledeburite to a coarse lamellar-pearlitic structure was thus produced by using different types of molds, the annealing time also being varied to obtain a finer gradation of structure.

The five sets of bars were cast in (1) iron molds, (2) green sand molds, and (3 to 5) dry sand molds with sand temperatures of 59°, 212° to 300°F, and 390° to 480°F respectively. Each series before testing was (a) left unannealed, or (b and c) annealed for 5 hr or 20 hr respectively at 1607°F. The bars were then rolled at 1560°F at a speed of 3 m (9.8 ft) per sec.

Marked differences in response to rolling were observed in even the first pass. As the rate of solidification of the cast bars diminished the bars became less easy to roll. Bars cast in preheated sand molds showed deep cracks and crumbled easily, while those cast in iron and green sand molds could be rolled without difficulty. The difference in annealing times did not appear to have any marked effect, as is shown quite clearly by the tensile values of the rolled bars, figs. 2 and 3. The hardness and shear values showed the same limited effect of annealing time.

Polished sections were prepared to study the structural changes from the initial cast to the finished rolled products. As expected, the iron mold and green sand castings were composed of pure ledeburite, and the proportion of

graphite in the casting increased with the sand temperature. Both annealing temperature and rolling had a pronounced effect on the breakdown of the cementite, while rolling also produced a marked refinement of the matrix.

These investigations appear to indicate that the initial structure of the casting determines in a large measure the response of the metal to rolling, in spite of the identity in chemical composition. With increase in amount of the precipitated graphite in the initial material, rolling became easier and the values of the mechanical properties of the rolled product showed a rapid drop off. High mechanical values after rolling therefore call for a ledeburitic structure in the initial casting coupled with heat treatment for several hours. High proportions of primary graphitic carbon already present in the original casting militate against ease of rolling and make the rolled product practically useless for technical purposes.

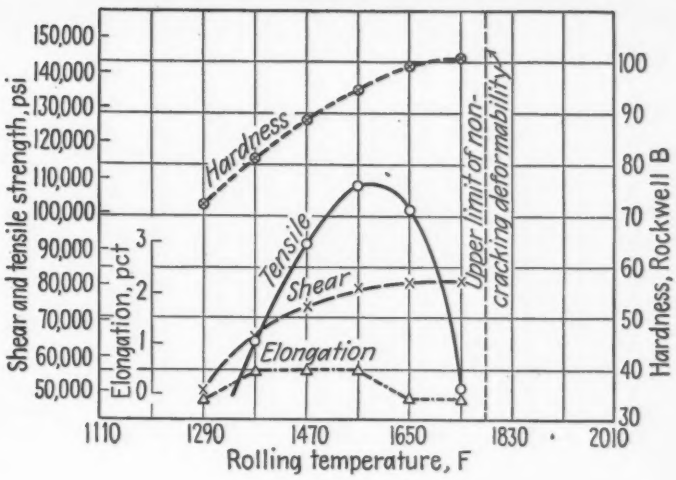


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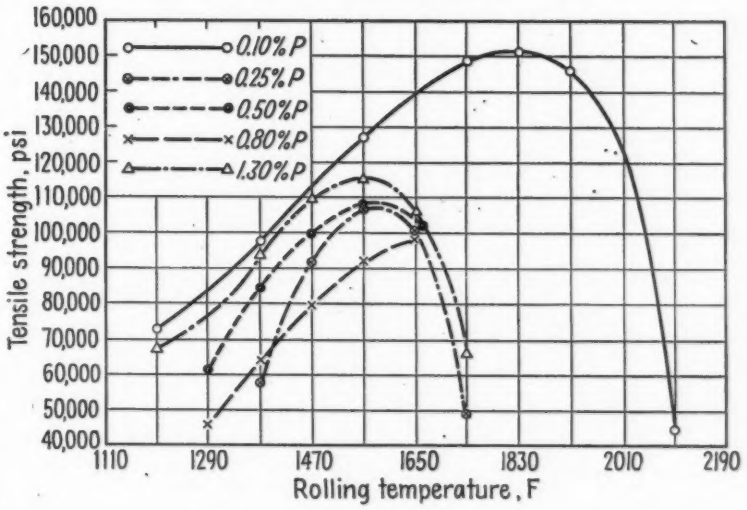
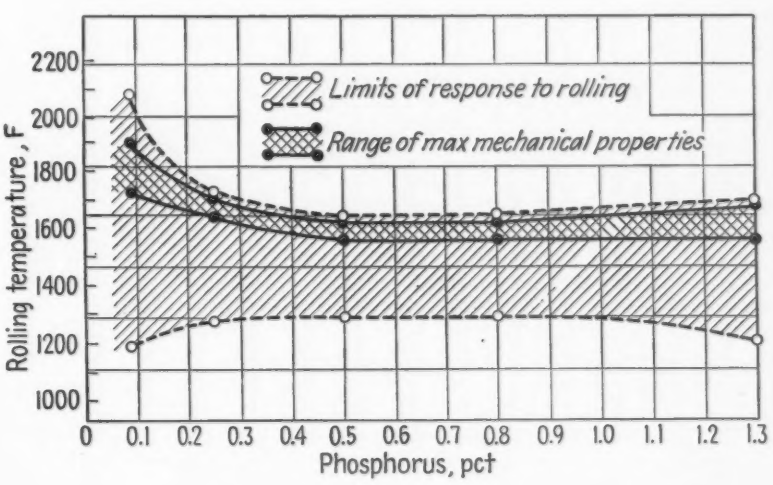
FIG. 6—Effect of rolling temperature on mechanical properties of iron with 0.25 pct P.



LEFT

FIG. 7—Effect of rolling temperature on mechanical properties of irons with varying phosphorus contents.

The effects of rolling temperature and phosphorus content were studied simultaneously on five sets of bars with a composition corresponding to that of the standard alloy (2.8 pct C, 1.1 pct Si, 0.6 pct Mn). The phosphorus in the various sets was 0.1 pct, 0.25 pct, 0.5 pct, 0.8 pct and 1.3 pct, while the rolling temperature was raised in stages of 90°F from 1067° to 2100°F. To study the effect of annealing time, the bars were annealed at 1607°F for 5 hr and 20 hr respectively. As already stated, the temperature of the bars on removal from the furnace was taken as the rolling temperature, and after each pass the bars were reheated for a short time in order to maintain the requisite temperature throughout the rolling sequence.



BELOW

FIG. 8—Rolling response and maximum mechanical properties plotted against temperature and phosphorus content.

Even on the first pass the phosphorus samples clearly revealed the marked effect exercised by the rolling temperature. At the lower temperatures (1070° to 1380°F) some bars cracked badly and others split right through. As the rolling temperature was raised the bars showed a greater readiness to respond to rolling, until eventually satisfactory deformation without cracking was realized in each pass. At the highest rolling temperatures, between 1560° and 1650°F, the bars again split badly, usually with great abruptness. Bars rolled either too cold or too hot are shown in fig. 4. The mechanical properties did not indicate any specific effect of the differences in annealing times, the values for metal-cast and green sand casts being practically identical, apart from normal scatter.

On the other hand, the curves in which mechanical

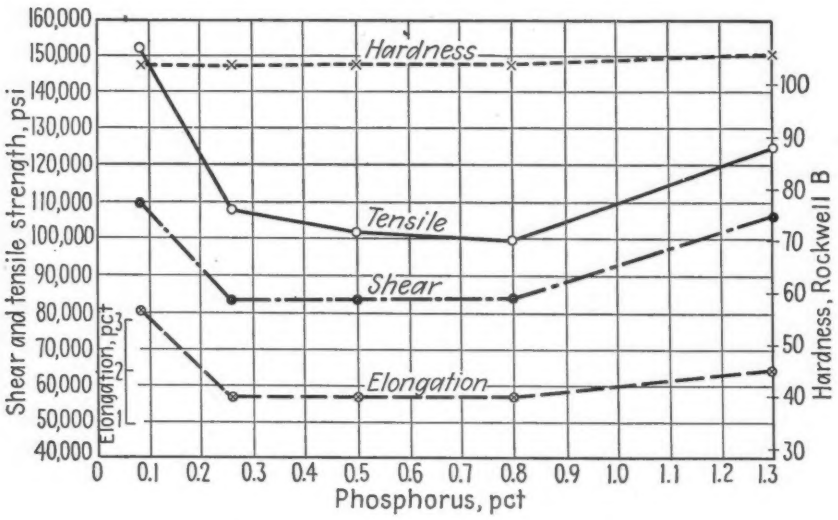
values were plotted against rolling temperature disclosed how an increase in the rolling temperature results in a substantial improvement in the mechanical values, which however, again diminish above a certain temperature as determined by the phosphorus content. The downward portion of the curves in figs. 5, 6 and 7 is not shown in all cases because individual values were determined at 90°F temperature intervals, a temperature difference which is already sufficient to transform satisfactory rolling properties into a complete absence of response to rolling.

Figs. 5 and 6 show the relationship between mechanical properties and rolling temperature for the bars containing 0.1 pct and 0.25 pct P. For every phosphorus value there is an optimum temperature range corresponding to optimum mechanical properties, this temperature range being usually very close to the upper limit of satisfactory deformation by rolling.

In large scale production reheating of the bars after each pass is patently neither feasible nor economic, so that lower mechanical values than those found here may be expected as a result of the unavoidable drop in temperature which will then occur in the rolling sequence. This was in fact found to be the case with bars of the low phosphorus compositions which had good rolling properties, when they were heated to 1830°F for the first pass and rolled down through all 11 passes without intermediate reheating.

Nevertheless, subsequent experiments showed that the temperature of the material at the last pass substantially determines the mechanical properties. The same physicals as obtained by reheating to the rolling temperature after each pass can thus be realized by rolling the bars through ten passes from an initial temperature of 1830°F with intermediate reheating, but giving a final reheat to the optimum temperature before the eleventh and last pass.

The effect of the phosphorus content was very marked in all these tests. As anticipated, the mechanical properties diminished as the phosphorus increased from 0.1 to 0.8 pct; they then increased again slightly but unmistakably for the 1.3 pct P composition (fig. 7). At the same time the permissible rolling temperature range was found to be somewhat greater for the bars containing 1.3 pct P than for those with 0.8 pct P. These conditions are clearly brought out in figs. 8 and 9. The latter graph gives the average mechanical properties for all heats plotted against the phosphorus content, and brings out the unexpected reversal in the trend of tensile strength, shear strength, hardness and elongation values.



ABOVE

FIG. 9—Influence of phosphorus content on various mechanical properties.

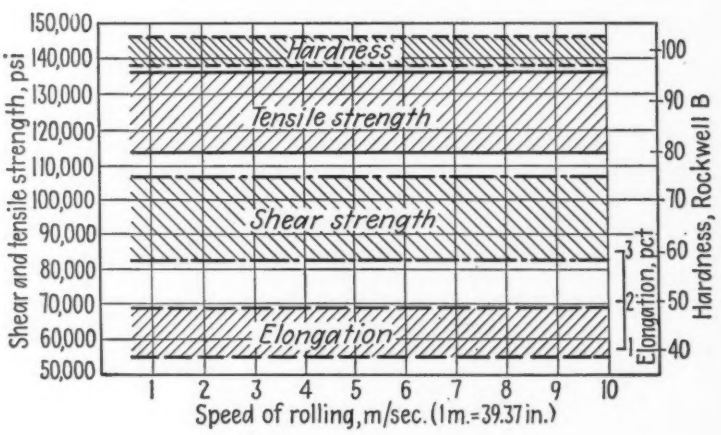
o o o

RIGHT

FIG. 10—Relationship between mechanical properties and rolling speed in an iron with 0.1 pct P.

Speed of Rolling

As a lower rolling temperature resulted in lower mechanical properties, it seemed feasible to reduce the loss of heat during rolling by increasing the speed of rolling. Since alloy cast irons are more difficult to deform than steel, it was to be expected that the irons would not be able to cope with a higher rate of deformation and would split during rolling.



To determine whether this would be the case, bars from four heats with 0.1 pct, 0.5 pct and 0.8 pct P were rolled at various speeds between 0.5 m to 10 m (1.64 to 32.8 ft) per sec, raising the speed in stages of 0.5 m (1.64 ft) per sec. The rolling temperature was 1560°F in all cases. Contrary to expectations, the speed of rolling proved to have practically no effect and no splitting occurred, even at 10 m (32.8 ft) per sec. Fracture tests and micro-examination also indicated no fundamental differences. This was further confirmed in mechanical tests, the physicals measured being almost constant over the whole speed range as

shown in fig. 10.

It may perhaps be concluded from these observations that cast iron of rolling quality can be rolled down to thin sheets and strip in continuous mills.

The authors will continue this discussion in the second and concluding part of this article which will appear in the next issue. They will describe the effect of carbon on rolling characteristics and the use of rolled iron for piston rings.—Ed.

From the analogy between forging and rolling, it appears that cast iron would also be susceptible to drop forging and pressing.

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Iron Ore Beneficiation in Germany

DETAILS of iron ore beneficiation plants supplying the Hermann Göering works, at Salzgitter, in Southwest Germany, together with other information regarding ore supplies for these works are contained in a recent report by a metallurgical team prepared by the CIOS and abstracted in a recent issue of *Iron and Coal Trades Review*, London.

The ores of the Salzgitter area are oolitic limonites with clay, according to the report. In general they are soft, some of them crumbling in the hand. Total estimated reserves are very large. The method of underground mining is sub-level stoping, with a back fill of concentrator tailing. The only surface mine plant visited was the Schacht Georg. The mine, it is said, could be developed to produce 15,000 tons per day. During the latter part of the war, a total of about 1000 men were employed. The mine has not been fully developed, but was producing about 4000 tons per day at the time of shut-down in April, 1945. This means that the production was about four tons per man-shift, which included both underground and surface labor. The ore from the Georg Shaft contains 27 pct Fe which, when concentrated by wet methods, produces a concentrate containing 38 to 40 pct with a 92 pct recovery of the iron.

Most of the ore in the Salzgitter area is extremely soft but there are pieces of gangue which are hard. Dry screening would be difficult and therefore this is done wet. The only screening operation is on a product of rolls which precede the hammer mills. The reduction ratio in any one crushing operation is extremely low, the reason for the large number of crushing operations being, of course, to create as little slime as possible. With one exception, the primary crushers are rolls instead of jaw or gyratory crushers.

The magnetic concentrating plant is located to the southwest of the blast furnace plant. The capacity of the plant is limited by the rotary kiln plant which has a capacity of 800 tons per kiln day. The ore enters the plant in railway trucks over the same tracks as the ore for the blast furnaces, and is crushed to = 6 in. in the primary roll crusher. It then passes through a second set of crushing rolls which crush to = 2 in., after which the ore is screened into three sizes. From the screening plant, it passes to the bedding plant, where it is possible to bed ores from various mines on the same bed.

From the bedding plant, the coarse ore goes to the fine crushing plant, where it passes through hammer mills, followed by rolls which reduce the material to −0.8 in. After being crushed, the ore passes to four mixers and from these to eight rotary kilns, which are 150 ft long and 10 ft inside diam. The kilns are fired with blast furnace gas. The time of passage of the ore through the kilns varies between 2 and 4 hr. The furnaces, according to the Germans, have actually treated between 800 and 900 tons per 24 hr per kiln or a total of between 6400 and 7200 tons per day. From the kilns, which convert the limonite to magnetite, the calcine passes through three sets of rolls which reduce it to −8 mesh. After the crushing, the material is passed over a set of two magnetic drums having stationary magnets and revolving brass drums. A clean concentrate is produced from the drum pullies and sent to the mixing plant where water, crushed coke and wet concentrate are added before the mixture is sent to the Dwight-Lloyd sintering plant.

The cost of operating the magnetic concentration plant was stated to be 12 Rm. per ton of concentrate. The analysis of the untreated ore averages Fe 27 to 28 pct; SiO_2 28 pct; CaO 5 to 6 pct; Al_2O_3 10 pct. Loss on ignition is 13.9 pct; moisture, 10 pct. The concentrate averages: Fe 40 pct; SiO_2 22 pct; CaO 5 pct; Al_2O_3 10 pct; and sinter: Fe 41 pct; SiO_2 21 pct; CaO 5 pct; and Al_2O_3 10 pct.

The wet concentration plant at Calbecht has the capacity for treating 4000 tons of ore per 24 hr. The feed to the plant averages about 27 pct Fe and the concentrate produced analyses between 38 and 40 pct iron, with a recovery of 92 pct of the iron. The calculated tonnage of concentrate would therefore be between 2500 and 2600 tons per day.

The process is exceedingly simple, amounting to a series of five crushing operations followed by washing. The slimes (overflow of the washer) contain the bulk of the tailing. The rough concentrate from the first washer passes through two sets of smooth face crushing rolls to a second washer, where the clean concentrate and tailings are produced. There is no dry screening operation and only one wet screening, which precedes the hammer mills. While an ore containing 10 pct moisture might be difficult to screen dry, it would seem that a vibrating screen would operate with reasonable efficiency and at the same time reduce the number of crushing steps, the report states. The first two crushing operations were carried on with rolls which had replaceable lugs set in the shell. The four other sets of rolls had smooth surfaces but there was no apparent fleeting device and the rolls corrugated badly.

Refractory Coatings For

A PERMANENT mold for producing pump castings showing the hot metal surfaces coated with refractory material. The casting produced in this mold is also shown.

Selection of the proper refractory coating is vital to the production of permanent mold castings having acceptable surface finishes. In this article the author discusses the results of an investigation to determine the effectiveness of various types of coatings for permanent molds. The method of applying coatings is also explained herein.

A FINE smooth finish on a permanent mold casting is vital to the acceptance of such castings by industrial users. The achievement of this finish is largely a function of the mold coating. The author recently conducted a series of experiments with various refractory materials for use as mold coatings and the results of these investigations are discussed in this article.

It is important, from a standpoint of obtaining maximum production of castings with good surface finish, that the coating used has a long life. It is desirable to use a die coating which will not chip off when the mold is shut down, then it will only be necessary to reheat the mold to temperature when it is started up again and recoating will not be necessary.

The usual procedure for spraying a mold is as follows: The mold is first sandblasted and placed in a heating furnace and brought up to a temperature of 600° to 800°F. After removing from the oven, the face partings are covered with a mixture of 10 pct electric furnace graphite and mineral oil. Tyrol 118 has been used successfully by the author. Information from Tidewater Associated Oil Laboratories indicates that 0.2 to 0.1 pct colloidal graphite is all that is required, which means that the 10 pct concentrate can be cut back and the oil content increased to meet individual requirements.

Since completion of this article, Mr. Bourassa, the author, has joined the Wheeler Consultancy, Springfield, Mass.—Ed.

Theoretically colloidal graphite should remain in permanent suspension because of like electrical charges which tend to repel each other, but unless a dispersing or stabilizing agent is employed some of the graphite is apt to settle out. This should not be a serious objection as the mixture can be stirred prior to each application to the mold. Tyrol 118 is a rather volatile oil and leaves a cleaner surface, a feature desirable for use as a mold oil for aluminum castings. High flash point oils have a tendency to form more deposits on molds than more volatile products and as the oil will serve primarily as a carrier for graphite, a clear burning lubricant would appear more suitable.

The mold cavities are then sprayed with a die coating, the coating is then brushed down with a fine steel wool brush, which helps to produce a fine smooth finish. A heavier coating is sprayed on the gates, runners and risers. The mold is placed back into the oven to receive an additional bake and also to bring it back to operating temperature.

A great deal of practice is necessary in spraying molds in order to develop the skill required to produce a fine finish on the casting. For best results the sprayer should be held 6 to 8 in. from the face of the mold to give a fine spray deposition.

The importance of using standard procedures for the application of mold coatings cannot be overemphasized. Whenever a good formula is developed, it should be definitely adhered to. Some permanent mold

Permanent Molds

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PERMANENT mold machine for producing gear cases showing the mold surfaces after spraying with a die coating.

makers use standard coatings, while others have their own pet formulas. One type of coating will work well with one type of mold, but not on another. It is important, therefore, that several different types of coatings, using various types of refractory material, be available to meet situations as they arise.

The first experiment conducted by the author involved the use of a graphite base mixture. Sodium silicate was added to the graphite and water and mixed together well. The mold cavities were sprayed with one type of graphite base coating and the gates, runners and risers were sprayed with another.

After a 2-day run the mold was in very good condition. The core had to be renewed daily due to metal pickups. Scrap was very low while this coating was used and no chipping or cracking of the coating occurred. The extraction of the casting from the mold was very good.

In the second experiment, red talc was used as a base refractory material, with graphite, sodium silicate and water. The mold cavities were sprayed with a thin concentration of die coating. The gates, runners and risers were sprayed with a heavier type of coating using the same ingredients. The trial run lasted 2 days and produced good results although, as was expected, the core coating was renewed. Extraction of the casting was good and the coating was in very good condition after the trial run was finished. Production was not hampered due to the coating, chipping or cracking from the mold. Scrap was very low.

In the third experiment, whiting was used as the basic refractory material with graphite, sodium silicate and water. Mold cavities were sprayed with the thin concentration of this coating while the gates, risers and runners were coated with a heavier concentration. The results were very good insofar as production was concerned. No shrinkage occurred and extraction was good. Surface condition on the casting prevailed throughout the experiments with this type of coating. Using this same type of coating, the mold was allowed to cool off for three 24-hr intervals and reheated and placed on production.

Whenever a mold coating is subjected to a cooling-off period, the coating as a rule cracks and chips off from the mold. A good economical coating is one that will not do this. If a coating can withstand cooling-off periods, production is not hindered in any way. Sandblasting is kept at a minimum and the time involved in painting a mold is also kept at a minimum.

After being subjected to the three cooling-off periods, the whiting base coating was not affected. It produced good clean castings with good surface characteristics. The core was renewed daily due to the metal being picked up when being extracted from the mold. This development was quite an aid to production as it permitted holding sandblasting and mold spraying to a minimum.

The last experiment was made using whiting as a base with sodium silicate and water. A very fine finish was secured from this type of coating. This coating could be adapted to many types of molds with very good results.

Photographic Reproduction as an

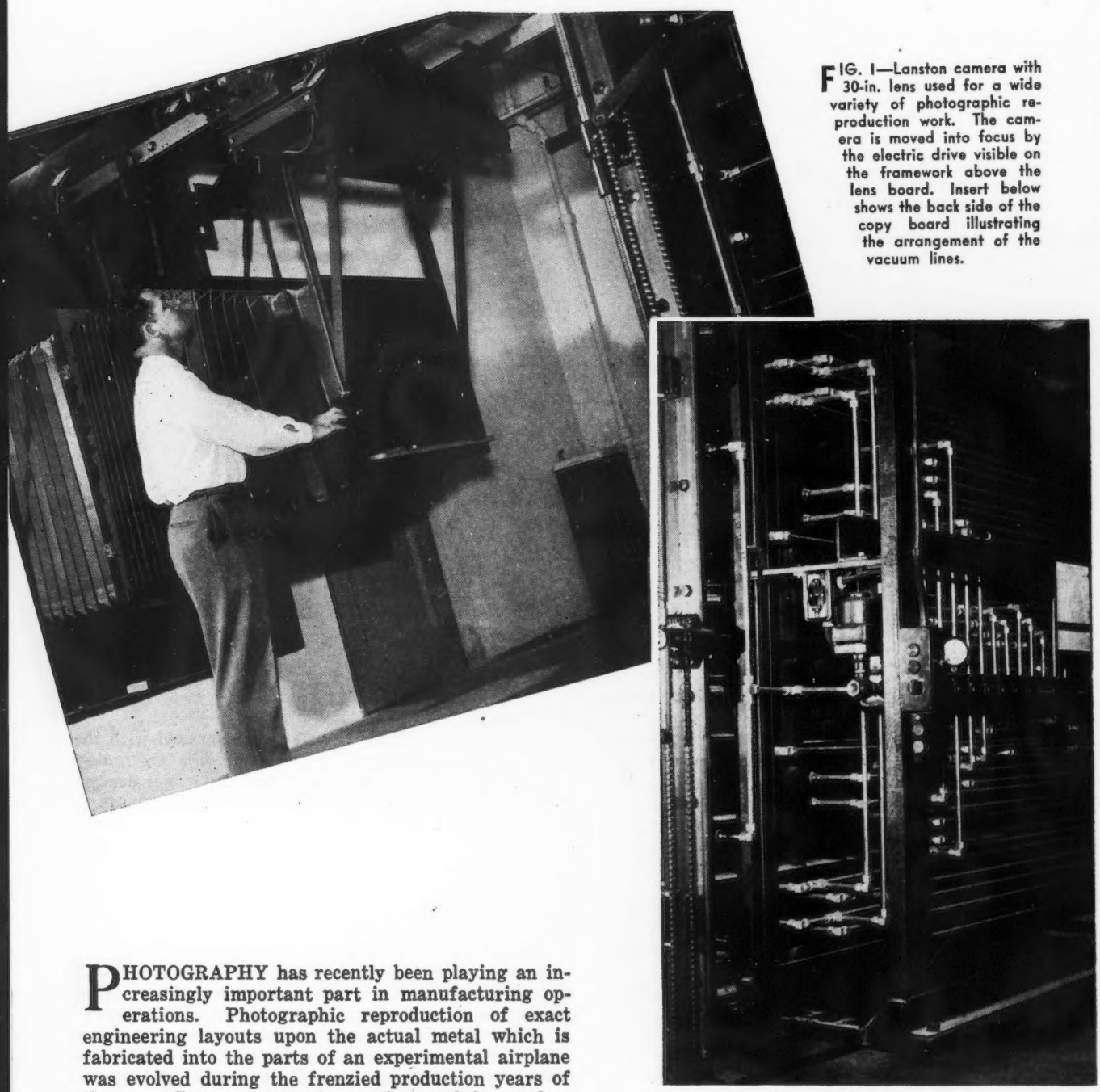

FIG. 1—Lanston camera with 30-in. lens used for a wide variety of photographic reproduction work. The camera is moved into focus by the electric drive visible on the framework above the lens board. Insert below shows the back side of the copy board illustrating the arrangement of the vacuum lines.

PHOTOGRAPHY has recently been playing an increasingly important part in manufacturing operations. Photographic reproduction of exact engineering layouts upon the actual metal which is fabricated into the parts of an experimental airplane was evolved during the frenzied production years of the war. Because of the imperative need for production, little time was available in which to describe this valuable technique which will undoubtedly have application to many other manufacturing industries.

At the Ryan Aeronautical Co., the process makes possible tremendous savings in time and costs due to the elimination of the metal templates (or patterns) for each of the thousands of parts which go into the building of an experimental airplane.

Formerly, standard procedure for the fabrication of experimental craft has involved drawing exact flat developments on 0.051 in. gage paint grip steel which has been coated with two coats of Dupont Preparakote primer. At Ryan, this work is done by the engineering mold loft department which makes flat developments from the orthographic projections which they receive from engineering. The layouts on steel are made by scratching through the paint to the metal surface with sharp steel scribes. Then begins the process of reproducing these layouts on numerous steel sheets which must be cut, filed and drilled to make the templates for the parts. The demands for extreme

Engineering Tool . . .

By DYCHE E. CLARK
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Use of photographic reproductions for cutting costs and speeding various phases of manufacturing operations is discussed in this article. The author explains in detail the techniques and equipment used in transferring engineering drawings directly to the material to be fabricated to eliminate templates, for reproducing drawings to various scales, for copying patterns and bend blocks directly from drawings, for projecting drawings to a shrink scale for pattern and die making, and for making a full drawing of a symmetrical part from a half figure. A detailed description is also given of a solution which permits a printed material to be bent or formed without cracking or separating, thus avoiding distortion.

accuracy of this work make it an expensive undertaking.

With the new photographic technique most of this task is eliminated. The layouts are photographically reproduced on the aluminum alloy, or other material required, and these parts are then cut, formed and drilled for installation in the plane.

Ryan has developed a special substratum solution which permits the perfect bonding of the sensitized emulsion to wood, Masonite, paper, plastic and practically all other materials including the difficult-to-treat Vinylite. This solution, which is sprayed on less than 0.001 in. thick, is not damaged by bending, cutting or otherwise working the part. Speed of this method is indicated by the fact that engineering layouts can be transferred to parts and delivered to the experimental department within one 8-hr shift.

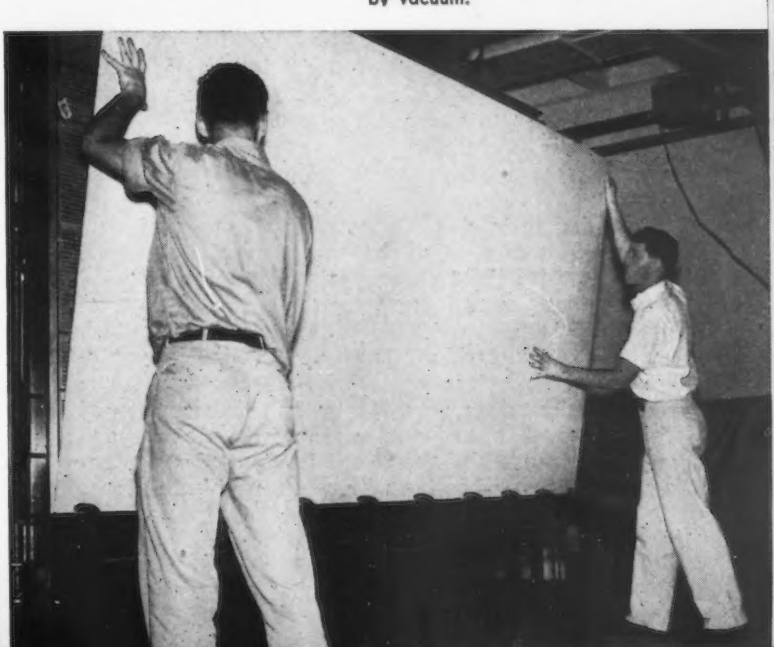
If more than six airplanes are contemplated, it is felt at Ryan, that the making of templates by the standard methods is justified because of the needs of production. However, even when large scale production is involved, the lack of templates on the first experimental planes is not a handicap because of the fact that approximately 80 pct of all original templates for experimental planes have to be corrected eventually due to changes in design. The improved system allows the manufacturer to check each of the parts in the actual airplane before any templates for large scale production are made, thus obtaining desired accuracy with the first templates.

The camera which has been developed for this photographic work in the aviation industry is a large and intricate piece of equipment costing $20,000 and weighing 17,000 lb. It is a Lanston Monotype Template Camera (fig. 1) and consists of three parts; the lens, the projection board and the negative carrier. Here the resemblance to other photographic paraphernalia ends because of the camera's gigantic proportions. Ryan's installation, which is the newest and most modern in the industry, has a 30-in. Goerz Artar lens, a 40x40 in. negative carrier and a 5x10 ft projection board.

These three elements are precisely connected together by means of a heavy steel framework which is suspended with coiled springs to absorb vibration, The installation requires the space of two large rooms, with the lens located approximately at the intervening wall. The lens and projection board are individually moved by electric motors to obtain the correct focus for any piece of work. This focusing mechanism, which is accurate to less than 0.001 in., has visible indicating dials. After obtaining the coefficients for a particular reduction or enlargement from the focusing chart, it is necessary to merely press the electric motor switches and watch the indicators until the correct digits appear. The camera is then in focus.

The huge projection board which holds the material to be copied is comprised of a heavy aluminum-faced waffle-type grid which is perforated by numerous openings connected to a system of pipes. A 5-hp motor exhausts the air from these tubes, producing a strong vacuum on the face of the grid which rigidly holds the work to be copied. It is essential that the drawings be held perfectly flat so that no distortion is introduced. Illumination is obtained from a battery of four 220 v, 35 amp, twin-white-flame carbon arcs. They are pressure-ventilated to remove all traces of heat and fumes. Figs. 2 and 3 show projection board

FIG. 2—Placing a 5x10-ft steel sheet coated with white primer on the copy board where it will be securely held by vacuum.



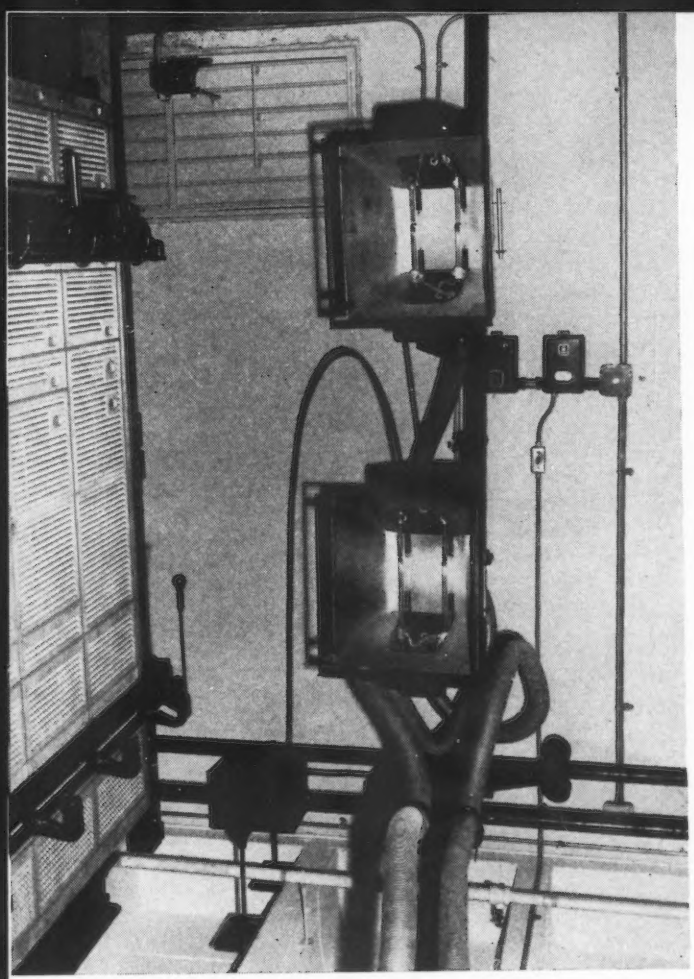


FIG. 3—View of one set of pressure ventilated twin carbon arc lights which provides illumination for an exposure. The waffle grid construction of the copy board can be seen to the right.

and details of the grid suface and the lights.

At Ryan the camera is housed in a specially constructed fireproof building which also contains the drawing files and spray booths. This two-story structure of 8-in. reinforced concrete has the latest automatic heating and ventilating system. By means of thermostatically-controlled fans and automatic lightproof louvers the air is maintained dust-free and uniform in temperature.

Ryan procedure for obtaining inscribed parts for an experimental airplane directly from the engineering layouts is as follows: The metal mold loft layout is placed on the 5x10 ft projection board where the vacuum holds it securely. A large negative, consisting of a sheet of plate glass which is treated with a coat of sensitized emulsion, is placed in the negative carrier in the other room. The camera is focused according to data obtained from a chart. The negative is usually made to one fourth scale from the original drawing.

The picture is now ready to be taken. The electric switch is pressed, the battery of arc lights flash a brilliant white light on the screen and the Packard shutter snaps open for exactly the required time interval. This exposure, which is electrically controlled, can be set for intervals from 2 sec to 20 min. The average negative requires from 25 to 45 sec at f. 32. The Packard shutter is actuated by an electric solenoid which is much more positive than most other means and eventually breaks the plastic leaves of the mechanism. At Ryan it has been found that replacing them with thin gage aluminum leaves makes a satisfactory substitute.

The negative is developed for 2 to 3 min in a lithotype developer to produce an extremely high contrast. It is then placed back in the negative carrier in the same position and preparation is made to project the light through it onto the actual metal which will go into the airplane.

A description of the Transfax process for reproducing drawings is given in the article "Reproducing Drawings on Metal," THE IRON AGE, Nov. 21, 1946, p. 62.

This sheet of aluminum alloy, or other material, is thoroughly cleansed with Dupont Prepsol. The Ryan substratum solution is applied by spray gun in an extremely thin coat to insure adherence during later forming. This solution dries in 3 to 5 min. Then the sensitizing emulsion, which is standard photo template emulsion, is applied by spraying or painting. It is wasteful to use more of this emulsion than is necessary to wet the surface. It must, of course, be applied in a dark room in which the only source of illumination is ruby red lamps. The emulsion dries in from 20 to 40 min in a warm room with circulating air.

The sensitized emulsion is a gelatinous substance and must be warmed to 120°F in a special porcelain-lined spray gun pot for spraying. All parts of the gun which come into contact with the emulsion must be either stainless steel or silver plated. It should be noted that the emulsion is extremely sensitive to contamination and must be handled under conditions of rigid cleanliness. For that reason the compressed air should be filtered to remove water, oil and foreign particles. It has been found helpful to attach a flashlight, with a deep red lens and a diffused reflector, to the spray gun for extra illumination on the work.

The sensitized metal is placed on the projection board in the projection room end of the camera which is darkened. A bank of 44-30 w fluorescent lights forms the projection illumination. These are alternate daylight blue and 360 B.L. ultraviolet lamps placed behind a sheet of flashed opal glass for diffusion. In front of the glass is another panel of clear plate glass to insulate the negative from heat.

The shutter is snapped open for from 15 sec to 2 min, depending upon the negative and the type of emulsion. The drawing is projected back to full scale on the sensitized metal. The sheet is developed in a system of redwood tanks which are 4 in. wide x 5½ ft deep x 13 ft long. Four tanks containing D-11 developer, short stop, hypo and wash are used. Developing requires from 2 to 3 min. From the wash tank, the metal passes to a drying tunnel where rapidly circulating air dries it. It is now ready to be stored or formed. The method of storing finished sheets is shown in fig. 4.

Many other production short cuts can be accomplished with the Lanston Monotype Template camera. Bend blocks, used in the aviation industry as accurate patterns over which to bend and form metal parts, may be made directly from engineering layouts. Here, the material is usually Masonite or wood which is coated with the Ryan substratum solution and sensitized emulsion and printed with the drawings. The material is cut and forms an exact pattern for the bending operations.

The camera is used at Ryan to make ⅛, 1/10 and other shrink scale projections for use in making dies. The drawings are projected on the sensitized metal in

n enlargement which is usually ⅛ in. per ft larger. The metal is cut along the photographic lines and plaster patterns are made from it. These patterns, which are used to make the sand molds for the casting of the Kirksite dies, are the proper amount oversize to compensate for the shrinkage of the cast metal upon cooling. This process eliminates the necessity for making both standard and ⅛ in. scale drawings.

From full scale lofted contours of an airplane, it is a simple matter to make the one fifth scale reproductions on metal which are used for wind tunnel test models. This operation can be accomplished with an accuracy of less than 0.002 in. error.

During the peak production of an airplane, large quantities of blue printing paper are used. The camera can be used to reduce all of the engineering drawings to half scale blueprinting. The reduction results in a saving of three fourths of the paper which, in turn, reduces sizable financial savings.

The camera can be of great service to the engineering department by reducing and enlarging various drawings which are made by different engineering sections to dissimilar scales. The drawings can then be matched together.

The extra task of making additional drawings to obtain right-hand prints from left-hand originals can be dispensed with by using the camera to photograph the drawings and then reversing the negative and printing.

Where a drawing from engineering is a symmetrical figure, it is possible to take a drawing of just one half of the figure and complete the design by rotating the negative around the centerline and printing. This technique, which saves considerable time in developing complete drawings, has been devised by the Ryan template reproduction department in the following steps:

(1) Two points are located on the centerline of the drawing at either extremity of the line. These locations must be made by inscribing other lines perpendicular to the centerline.

(2) The drawing is placed in the camera projection board and a negative is made from it.

(3) After the negative is developed, it is placed back in the negative carrier and the projection light is projected through it to a sensitized plate. While this projection is being made, and the two locating points are visible on the plate, they are circled with a pencil mark.

(4) A daub with developer and hypo is used to locally develop just these two circumscribed areas to bring out the points at the intersections of the crossed lines.

(5) The negative is taken out of the carrier, all writing and other material which may be confusing when reversed is opaqued out, and the entire negative is masked off witht he exception of the two reference points. The opaqueing may be done with standard photo opaque and a brush.

(6) The negative is reversed, by rotating it around the centerline, and it is then placed back in the carrier. Due to the thickness of the glass this operation moves the negative picture back from the lens. To correct for this difference, the lens is moved forward to the negative carrier a distance equal to two thirds the thickness of the glass negative. A full correction is not made because the refraction of the glass partially compensates for the difference. The projection board must also be moved back a like difference.

(7) The image of the reference points is projected on the metal drawing and the projected and developed points are lined up until they are exactly superimposed.

(8) The masking is removed from the negative and the drawing is projected to the metal plate where it will match the other half which had previously been exposed. When developed, a full drawing will be had that is perfectly symmetrical.

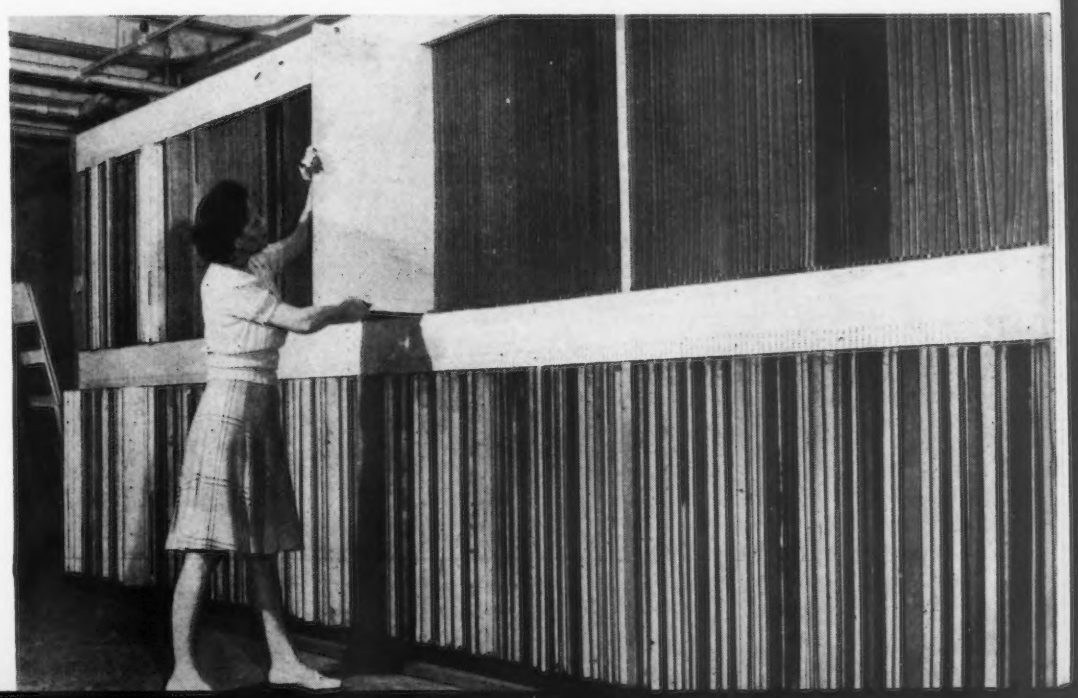
The substratum solution previously mentioned was developed to permit the photographic print of an engineering drawing to be retained on the material even when the material is to be submitted to severe bending and stretching operations.

In order to transfer a drawing to a sheet of any material, the substance must be coated with a thin film of sensitized emulsion. Most materials are first painted with a white primer such as Dupont Preparakote. This provides a smooth white background for the photographic lines. Then the sensitized emulsion is sprayed on this primer to which it readily adheres. For ordinary reproduction jobs this technique is adequate, but it is not satisfactory when used with sheets of material which are to be formed. Severe bending or stretching of the coated material causes the primer to crack and separate, distorting the photographic pattern which covers it.

For several years various companies have made intensive investigations of this problem in an attempt to find a suitable bonding material which could hold the emulsion and remain unaffected by short radius bends and severe stretching. Ryan has developed a substratum solution which performs this task with admirable efficiency. It can be sprayed on any material in thicknesses of less than 0.001 in. and will

(CONTINUED ON PAGE 121)

FIG. 4—Blank and inscribed steel sheets are stored in these racks in an air-conditioned room.



Modernized Setup Cuts Heat Tr

IN UNDERTAKING the entire re-arrangement of its heat treating department for peacetime production, Fellows Gear Shaper Co., Springfield, Vt., has made every effort to insure quality of product and economy of output. Straight-line production has been provided for by means of standard equipment, installed with details dictated by experience as conducive to efficiency. Since about 10 pct of the work, in man-hours, done in the heat treatment department is on gear shaper cutters, the equipment has been carefully selected and installed.

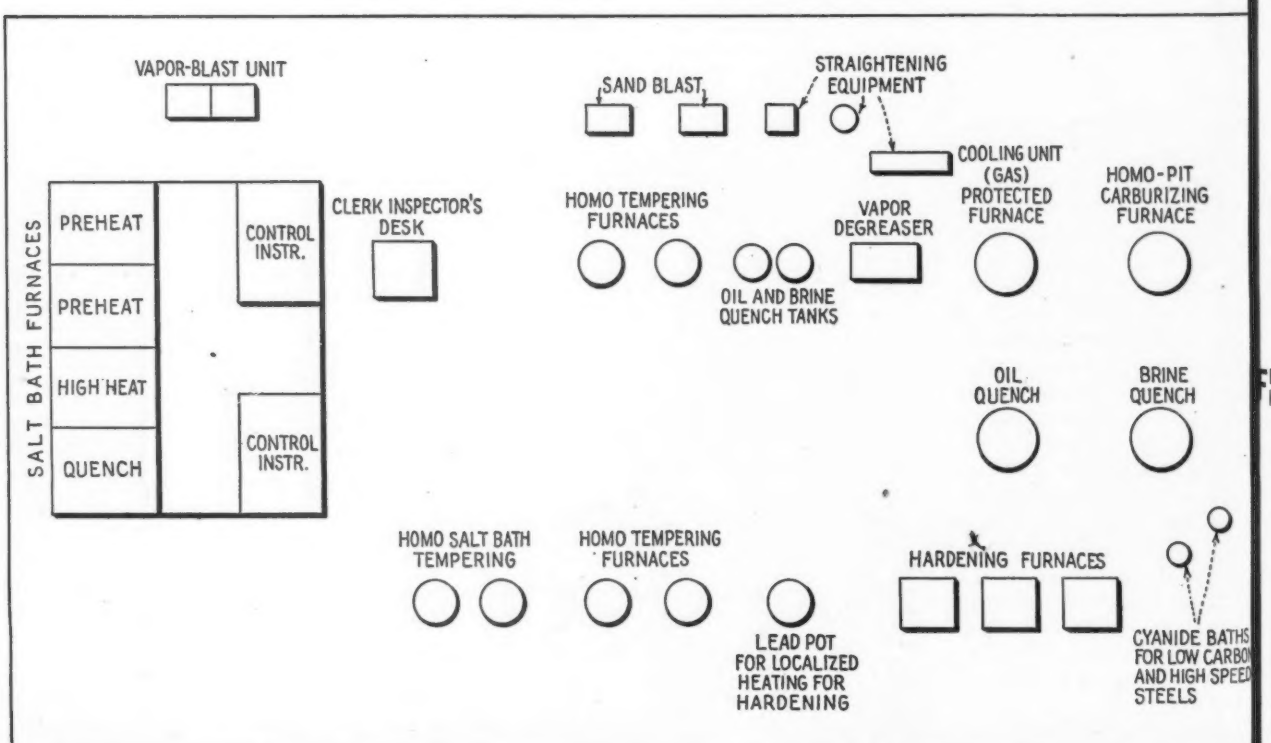
The heat treatment layout is shown in the diagram, fig. 1. It is served by a 2-ton travelling crane controlled from the floor by a pendant push-button station. Starting at the right, there is a Homo pit-carburizing furnace, see fig. 2, which is loaded and unloaded with the crane. Proceeding from right to left are (1) the gas-protected atmosphere cooling unit, (2) the Detrex vapor degreaser, and (3) four Homo tempering furnaces. Close by are the Pangborn sand-blast units and the straightening equipment. Across the aisle from the carburizing furnace are the brine and oil quench units, also served by the overhead travelling crane. The remaining heat treating equipment is located as shown in the diagram.

The crane has been equipped with a device designed to raise the work up and down in the quenching bath, thus agitating the work by mechanical means during quenching. This has served to improve the metal lurgical quality of product and has been a marke saver of manpower. The apparatus consists of standard gear-head motor having a crank provide with a ball bearing pulley. The hoisting cable passe around this pulley, so that when the motor, controlle by a special push button on the pendant station, is i operation the crank gives a slow up-and-down motio to the dead-end part of the cable and to the wor immersed in the quenching bath. Work can be raise or lowered in the bath by the hoist motor while th agitating motion by the crank motor is occurring. Us of limit switches to guard against accidents has adde markedly to efficiency within the department.

The oil and brine quenching tanks are each 96 i in depth. The brine tank, which contains a 12 pe rust inhibited solution is held at a temperature o 70°F by a heat exchanger and a 250 gpm circulatin pump.

A simple device has been added to the vapor de greaser by means of which about $4.50 is saved pe day in electrical power, in addition to the saving i cooling water. The degreasers have four electric heating units normally all in continuous operation although conditions are such that it is sufficient t have just one heating unit in continuous service t keep the unit ready for use, provided the other thre are switched on while work is being degreased. T

FIG. 1—Diagrammatic layout of heat treating department.



Treat Costs . . .

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By JOHN G. GURNEY

Supervisor, Heat Treating Dept., The Fellows Gear Shaper Co., Springfield, Vt.

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The organization of an efficient heat treating layout by a machine tool manufacturer to produce parts economically and high in quality is described herein. Written for practical heat treaters, the article points out methods of cutting costs by saving time and physical energy of workmen, as well as means of obtaining metallurgical uniformity of product. The duties of a clerk-inspector and his importance in promoting efficiency in the heat treating department are also discussed.

his end a foot switch was installed, which can connect all three heating elements for 2-min intervals with the aid of a time clock in the circuit. In the course of a day this saves about 20 hr, on three heating elements, which would otherwise be wasted. Such an arrangement might, of course, not apply in another plant, but for the conditions here it has been very satisfactory.

One of the straightening units, a pneumatic hammer such as found in stonecutting sheds, has been adapted for the lighter type of work. It was provided with a double foot-treadle, one element being used to move the hammer to the work, and the other to control the operation of the hammer. This hammer peens the low side of a shaft, thus straightening it. Limits of 0.0005 in. were maintained before grinding on airplane generator shafts made in connection with the company's wartime production.

The Vapor-Blast unit indicated in the diagrammatic layout of the department is used on ground and unground work where the finished surface needs thorough cleaning after heat treating without changing its physical or chemical character. The Vapor Blast is also used to wash off the skin after grinding. The Vapor-Blast, or liquid hone, uses a very fine abrasive in water which is blasted at the work by compressed air.

Fellows gear shaper cutters and tools are heat treated in an Ajax-Hultgren high-speed salt bath hardening unit, which consists of two preheat, one high heat, and one quench furnace. A few machine parts are treated in the preheat furnaces. This installation has several unusual features of much practical value. For instance, the working floor of the unit is 1 ft higher than ordinarily in order to conserve workers' energy in lifting. A hood has been provided over the salt bath in order to remove fumes. Around its edges there is a curtain of loose chains, which is easy to see through and to push aside when work is placed in the baths or taken out. The curtain, illustrated in fig. 3, affords effective protection to the workers against the heat, and has been mounted in sections 2 or 3 ft long to facilitate removal when necessary.

It is noticeable throughout the department that every effort has been made to conserve the physical energy of the workers insofar as practicable. In conformity with this policy, metal racks or fixtures have

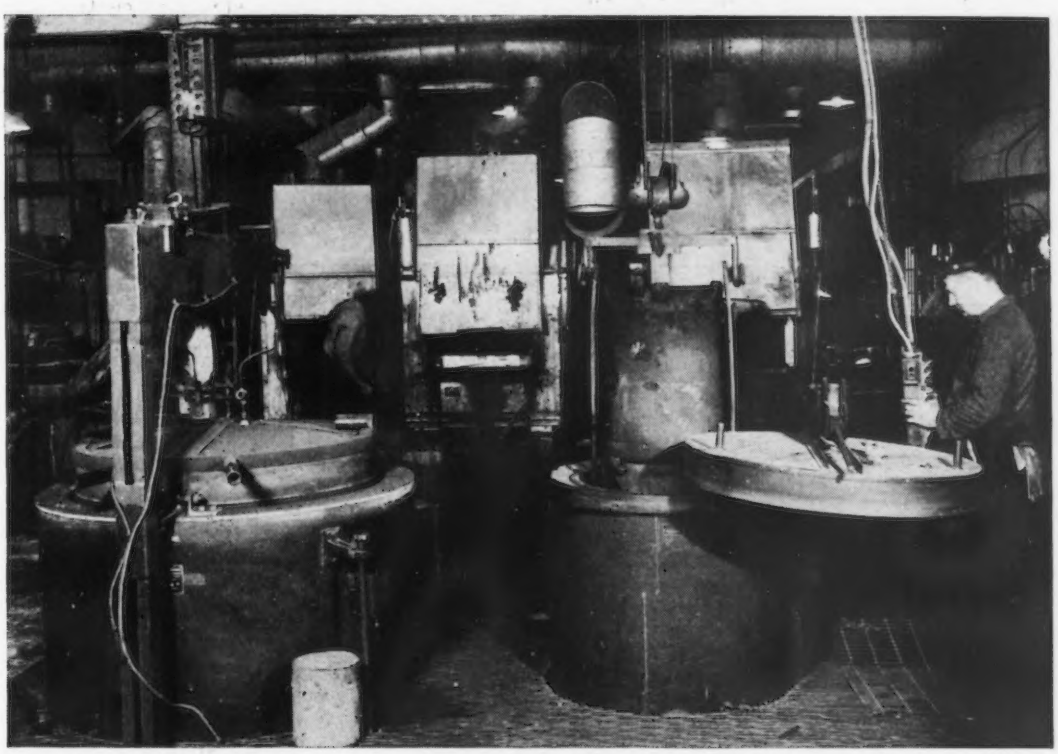

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FIG. 2—Unloading Homo carburizing furnace.

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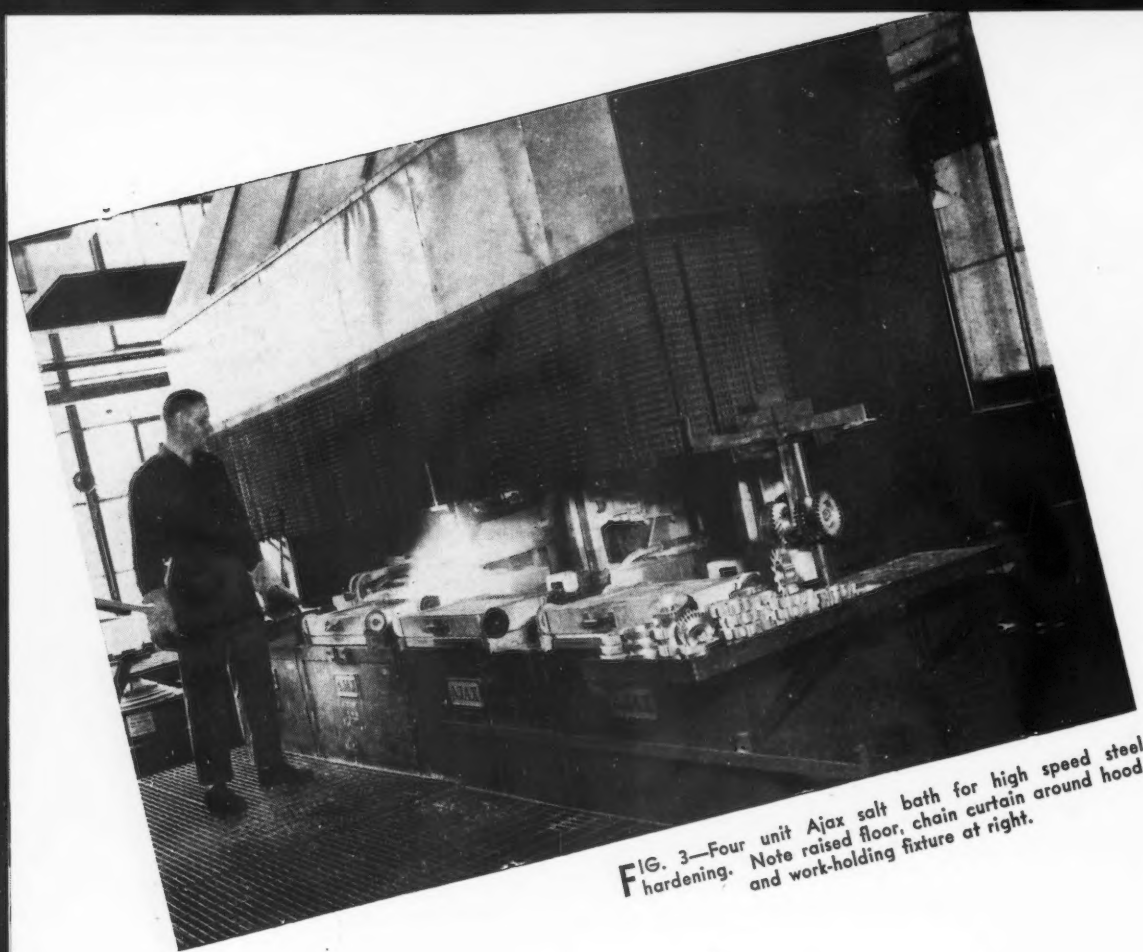


FIG. 3—Four unit Ajax salt bath for high speed steel hardening. Note raised floor, chain curtain around hood, and work-holding fixture at right.

been provided in connection with the Ajax-Hultgren salt bath unit to hold the work to be heat treated. They are loaded just outside the hood, near the preheat bath, while supported on adjustable hangers. The loaded racks are carried by the operator to preheat, highheat, quench and cooling table, on a hook built so as to control swing. The racks are built so as not to sway against electrodes while holding the work in the bath.

The loaded rack automatically starts the timer in the high-heat bath. The timer gives a double warning, first to advise the operator to start clearing the quench bath of the previous load to make room for the next load coming out of the high-heat bath, and second, to advise the operator to remove the load from the high-heat furnace. The warning sound continues until the load is removed, after which the timer automatically resets. The timer is set for the predetermined period of immersion in the high-heat bath at a location near the point where the racks are loaded, to reduce walking effort on the part of the operator.

Work is generally left in the quench bath until the next load comes out of the high-heat furnace. Of course, the operator must sort the parts to be treated as they come, according to kind of steel and length of time each is to remain in the high-heat unit. The work is then assembled into loads requiring similar treatment and is ready to go into the high-heat bath. A detailed record of the work done is kept.

The control instrument cabinets are located so as to be convenient for the operator. They contain space for the necessary tools, checking instruments, supplies such as new electrodes, work-holding fixtures, work record files, etc. The control instrument on the high-heat is of the Rayo-tube type.

These instruments have been supplemented with devices, such as a warning signal on the high-heat unit, which operates when the temperature goes off the control point—either up or down. The signal sounds in the center of the department as a precaution against the occasions when no one is near the furnaces and guards against putting work into too hot or too cold a bath. It also guards against letting the bath burn or freeze for lack of attention at any time, including week ends when the equipment is idling.

FIG. 4—Clerk-inspector's station.

The work cooling table is made of floor grating and is self cleaning. It is located near the quench bath, and contains bath cleaning tools and an adjustable hangar for work-holding racks which cannot be unloaded while hot. The work-holding racks are unloaded, cooled in a cold running-water tank and hung in a storage cabinet

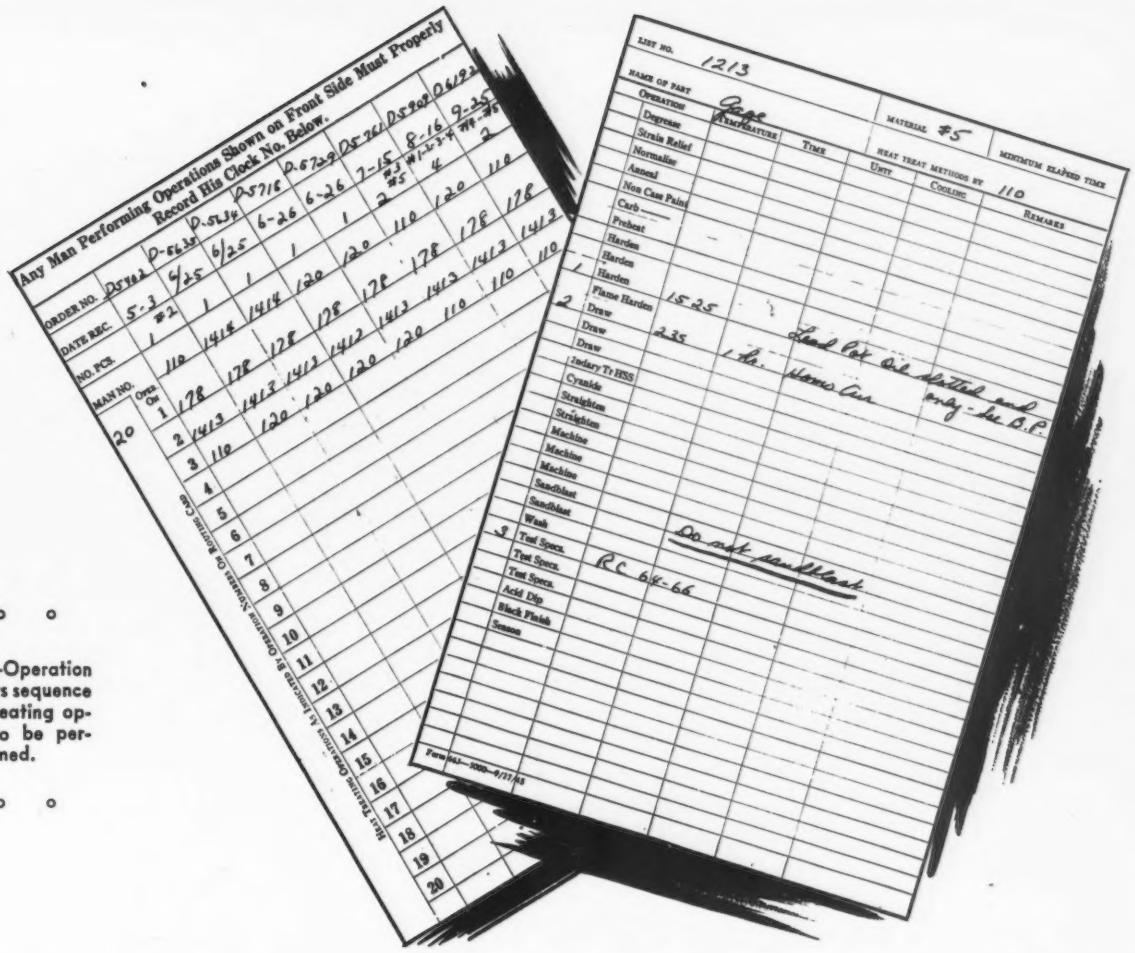


FIG. 5—Operation card lists sequence of heat treating operations to be performed.

all in one continuous motion made possible by the special carrying hook. Work is taken from the cooling table, by the operator of the Homo tempering furnace, washed and tempered, or drawn.

The arrangement of furnaces, control cabinets, flooring and electrical apparatus has been planned for easy and quick removal of a furnace. Spare units are kept on hand ready for service, since it is essential that there be no lengthy shut-down of hardening equipment.

An important factor in promoting efficiency in the heat treating department is the clerk-inspector, see fig. 4. Work coming into the department first goes to the clerk-inspector who looks it over with care to make certain that all steps preliminary to heat treatment have been taken and that heat treating equipment is available for the job. The need for such precautions has been demonstrated by experience in order to save much time and effort. After reading the instructions with the incoming work, the clerk-inspector fills out the "Operation Card," fig. 5.

On the basis of available data, his practical knowledge and that of the superintendent, the clerk-inspector enters the details of the treatment the work is to receive on the card. As illustrated in fig. 5, the left-hand column indicates the sequence of operations, while in the "Remarks" column at the right, detailed instructions are given, based on actual experience. Other instructions may also be added informally, such as "Do not sandblast" underlined with red, which expedite the work, and avoid false steps, loss of time and waste of material. In this instance, the result of sandblasting would be undesirable, and is probably so likely to be done as a matter of course, that the extra precaution has been taken of writing in the admonition.

Another detail covered on the card is to take into account the additional depth of case necessary in order to allow for grinding. Since the depth of case in the finished product is given as a finished dimension on the blueprint accompanying the incoming work, the clerk-inspector must make the proper allowance for grinding.

The reverse side of the card (fig. 5) contains further information for the operators and also provides space for each operator to enter his clock number when he has finished a given step in the heat treating cycle. This provides a record of the individual performing the work in each step, and more important, it gives increased assurance that the operations are performed, and in the proper sequence.

When the heat treatment operation has been completed, the clerk-inspector inspects, or tests, the work to determine whether it comes within the specifications and, if satisfactory, signs it out of the department. However, it is realized that in spite of the devlopment of the science of metallurgy, control instruments and mechanical devices, the job of the heat treater is still somewhat of an art. It cannot be totally impersonalized.

Maintenance of the heat treating equipment is performed by departmental personnel, because much of the apparatus is unique to the department and needs more than the regular electricians, or other maintenance personnel, to take care of it.

Determination Of Titanium Nitride In Ferroalloys

By LOUIS SILVERMAN
Materials Engineering Chemical Lab., Westinghouse Electric Corp., East Pittsburgh, Pa.

TITANIUM increases the hardenability of high temperature alloys while titanium, present as a nitride, does not. For this reason, detection and estimation of titanium nitride is of interest. Previous studies of the treatment of steels with copper potassium chloride[1] have shown that certain materials may be expected in the insoluble residue. The residuals may be columbium and tantalum carbides, titanium oxide, titanium nitride, tungsten, copper sulphide, magnetic oxide of iron, etc.

For a study of the separation and identification of titanium nitride in steels and ferroalloys, the following samples were chosen: Bureau of Standards samples Nos. 101b, 121a, 123, 123a and Westinghouse alloy No. 47 (Ti-2 pct, Ni-42 pct Co-20 pct, Cr-20 pct, Fe-15 pct).

Procedure

A 5.00-g sample of the steel to be analyzed is placed in a 600-ml beaker and covered with 500 ml of copper-potassium-chloride solution.* The mixture is heated to 140° to 158°F and stirred until the alloy has disintegrated and all the metallic copper has redissolved. After the solution has been allowed to settle for about 30 min, it is decanted through a 15 cm S and S White Ribbon filter paper. The residue and filter paper are then washed with copper chloride wash solution,** after which the residue is transferred to the paper with cold water and washed until the paper and runnings are colorless.

To obtain a qualitative detection using an X-ray powder diffraction procedure, the filter paper is washed with alcohol. After the paper has been dried in an oven at 122° to 140°F, scrape the powder from the paper, grind and mix the powder in a mortar. A portion of the powder is then transferred to a glass plate, two drops of flexible collodion added and mixed until the solvent evaporates. The resultant product is extruded through a tube, and the prepared sample is placed in a powder camera. A copper target radiation source with a nickel filter is used with the X-ray diffraction apparatus. The electrical constants are adjusted to 35 kv and 20 milliamperes. For a 114.6 mm camera, the exposure time is 16 hr (0.5 mm collimating tube)—57.3 mm cameras require about 30 to 25 min. The double S span can now be measured and the *d* values (interplanar spacing as used in Bragg's equation) calculated.

* *Copper-potassium-chloride — 500 y $CuCl{\cdot}2KCl{\cdot}2H_2O$, 100 ml of HCl, and 2000 ml water.*

** *Wash solution — One volume copper-potassium chloride solution to four volumes water.*

The principal *d* lines[2] for CbC, TaC, TiN, TiO_2, TiC and Cb_2O_5 are listed in table I. It is observed that the *d* lines for CbC, TaC and TiN are almost identical, and intensity values differ only moderately, while the lines for TiO_2 and for Cb_2O_5, however, are distinctly different. Hence an unknown diffraction pattern which indicates the presence of either one, or both, TiN and CbC may easily be confirmed by burning some of the original sample to oxide. The diffraction patterns of TiO_2 and Cb_2O_5 are easily distinguished.

In order to obtain a quantitative determination for titanium in the residue, a 5.00-g sample of steel is first treated as described in the first paragraph under *Procedure*. Return the paper to the beaker, add 15 ml nitric acid and 10 ml perchloric acid, and heat to

(CONTINUED ON PAGE 153)

TABLE I
Principal "d" Lines and Intensities [1]

CbC*		TaC**		TiN***		TiO_2		Cb_2O_5		TiC†	
d	I/I_o	d	I/I_o	d	I/I_o	d	I/I_o	d	I/I_o	d	I/I_o
2.54	0.80	2.56	1.00	2.54	0.56	3.46	0.60	4.04	0.60	2.49	0.75
2.20	0.80	2.22	0.80	2.20	0.80	3.22	1.00	3.17	1.00	2.15	1.00
1.55	0.80	1.57	0.90	1.55	0.80	2.48	0.80	2.48	0.50	1.52	0.50
1.33	0.80	1.34	0.90	1.33	0.56	2.17	0.40	1.97	0.40	1.30	0.25
1.27	0.60	1.28	0.50	1.27	0.56	2.04	0.30	1.81	0.50	1.245	0.10
1.10	0.40	1.11	0.50	1.10	0.40	1.68	1.00	1.67	0.40	0.965	0.09
1.01	0.60	1.02	0.80	1.01	0.40	1.62	0.60	1.65	0.40	....	....
0.98	0.60	0.99	0.80	0.98	0.80	1.45	0.40	1.57	0.30	....	....
0.90	0.80	0.91	1.00	0.90	0.80	1.09	0.40	1.46	0.30	....	....
0.85	0.80	0.86	1.00	0.85	0.80	1.04	0.40	1.34	0.40	....	....
0.78	0.60	0.79	0.80	....	....	....	....	....	....	....	....

[1] See reference No. 2.
* a_o=4.40A° cu. **a_o=4.446a°cu. ***a_o=4.225A° cu. †a_o=4.318A° cu.

TABLE II
X-Ray Diffraction Analysis of Residue

Sample	Composition of Residue
Bureau of Standards, No. 101b	Fe_3O_4, principal constituent
Bureau of Standards, No. 121a	TiN
Bureau of Standards, No. 123, 123a	CbC and/or TaC
No. 47 Alloy	TiN and TiO_2

10,000 Trade Names

. . . The sixth section of the Trade Name Directory, compiled by THE IRON AGE as a ready reference for engineers and business executives, is presented herewith. Previous sections of this directory appeared in the issues of Jan. 2, p. 172; Jan. 9, p. 65; Jan. 16, p. 64; Jan. 23, p. 63; Jan. 30, p. 60. This directory tells what a trade name covers, its composition if a material, where or how it is used and the full address of the manufacturer or supplier.

—M—

(Continued)

Micro-Klean: Micronic-type filter made of molded fibre. Cuno Engineering Corp., 1517 S. Vine St., Meriden, Conn.

Miccrolac: Transparent coating material sprayed, brushed or dipped on metal products as protection against sulphur dioxide, sunlight, moisture, oil grease, gasoline and chemical fumes. Michigan Chrome & Chemical Co., 6336 E. Jefferson St., Detroit.

Microloid: Synthetic maintenance paint for corrosive environments such as plating equipment. Michigan Chrome & Chemical Co., 6340 E. Jefferson Ave., Detroit 7.

Micromatic: Manufacturers of bore and external cylindrical honing tools and machines. Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4.

Micromax: Instruments, pyrometers. Leeds & Northrup Co., 4945 Stenton Ave., Philadelphia 44.

Micro-Mold: Bore honing tools and abrasives used therewith. The latter are encased in a nonabrasive material which reduces rate of wear and increases normal performance. Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4.

Micro-Processed: Beryllium-copper coil and flat springs. Instrument Specialties Co. Inc., Little Falls, N. J.

Micro-Rold: Stainless steel sheets and strip. Washington Steel Co., Washington, Pa.

Microsize: Bore honing machines controlled by automatic sizing device including a master gage ring. Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4.

Microton: Mechanical stage for use with the Tukon Tester for making indentations in selected small areas. Wilson Mechanical Instrument Co., 383 Concord Ave., New York 54.

Midcyl: Centrifugally-cast plain carbon steel for cylinder liners. Midland Motor Cylinder Co., Birmingham, England.

Midflex: Thermostatic bimetal. H. A. Wilson Co., 107 Chestnut St., Newark, N. J.

Midget King: Electric hoist. Yale & Towne Mfg. Co., 4532 Tacony St., Philadelphia 24.

Midget Milling Cutter: High-speed steel or carbide cutting tools having cutting teeth ground into the solid hardened forms; generally used in flexible shaft equipment. Severance Tool Industries, Inc., Saginaw, Mich.

Midohm: Heat-resistant copper alloy with 22 Ni for resistances. Driver-Harris Co., Harrison, N. J.

Midvaloy: Series of austenitic heat-resisting alloys with 26-60 Ni, high Cr for turbine blades, valve stems, gas turbine rotors, chemical apparatus. Midvale Co., Nicetown, Philadelphia.

Mid-West: Abrasives. Mid-West Abrasive Co., Owosso, Mich.

Migra Iron: High silicon-manganese cast iron for pistons and cylinders. Vereinigte Stahlwerke, Dusseldorf, Germany.

Mill Bearing: Babbitt metal. H. Murdoch & Co., Frick Bldg., Pittsburgh.

Mill Brass Mix: Cu alloy for bearings, bushings. E. A. Williams & Sons, Jersey City, N. J.

Millaloy: Steel for shear blades. Doelger & Kirsten, Inc., 3015 W. Chambers St., Milwaukee.

Millard Metal: See Avialite.

Millenite: Fe alloy for high-duty castings. Lake & Elliot Ltd., Braintree, England.

Millite: Luminaires. Westinghouse Electric Corp., East Pittsburgh, Pa.

Milpal: Machine vises. Porterfield Mfg. Co., 749 E. 15th St., Los Angeles 21.

Milrite: Lead babbitt for bearings. National Lead Co., 111 Broadway, New York.

Milwaloy: Medium-carbon Cr-V alloy steel for nitriding. Milwaukee Steel Foundry Co., 435 S. Water St., Milwaukee.

Milwaukee: Diecastings of all types. Milwaukee Die Casting Co., 1015 N. Fourth St., Milwaukee 3.

Milwaukee: Machine tools. Kearney & Trecker Corp., Milwaukee 14.

Milwaukee Wrot Washers: Wrought washers. Wrought Washer Mfg. Co., Milwaukee 7.

Mini-Map: Small, light-weight batteries. National Carbon Co. Inc., 30 E. 42nd St., New York 17.

Minimax: Dental amalgams. Minimax Co., 185 N. Wabash Ave., Chicago.

Min-Mum: Protective wax for aircraft and automobile exteriors. Turco Products, Inc., Los Angeles 54.

Min-Ox: Heat and wear resistant ferrous and nonferrous alloys for glass molds, slides, bearings, dies for tile pressing, etc. Binney Castings Co., 2555 Dorr St., Toledo 7.

Miracle: Fire extinguishers. M. L. Snyder & Son, Jasper & York Sts., Philadelphia 25.

Miraculoy: Alloy steel with Mn-Si-Cr for heavy duty castings. Sivyer Steel Casting Co., 1677 S. 43rd St., Milwaukee.

Miralite: Complex aluminum alloy for pistons. Miralite, Ltd., Montlake, England.

Misco: High-chrome stainless steel for heat treating boxes, furnace parts, valves, stills. Michigan Steel Casting Co., 1997 Guoin St., Detroit.

Miscrome: Straight-chrome stainless steels, for chemical engineering equipment and for cast parts, furnace grids. Michigan Steel Casting Co., 1997 Guoin St., Detroit 7.

Mishima: An Alnico-type permanent-magnet alloy. U. S. Patent 2,027,994 (1936). General Electric Co., Schenectady.

Mitchalloy: Alloy cast irons with Ni, Cr, Cu; for brake drums, grinding and abrasion applications and heat and corrosion resistance. Robt. Mitchell Co., Ltd., Montreal.

Mixend: Weld metal for cast iron. Arcos Corp., 1515 Locust St., Philadelphia.

M-L Cutting Oils: Mineral-lard type cutting oils for use on nonferrous metals where nonstaining from sulphurized type oils is to be avoided. Gulf Oil Corp., Gulf Bldg., Pittsburgh.

Mocasco: Steel with 0.35 Mo for cylinder heads and liners, gears, valves. Motor Castings Co., 1323 S. 65th St., Milwaukee.

Model 77 Spring Boxes: For use with railroad tongue switches. Bethlehem Steel Co., Bethlehem.

Mo. Flint: First quality dry-press firebrick particularly adapted for use in oil fired furnaces. Chicago Fire Brick Co., 1467 Elston Ave., Chicago 22.

Mogul: Equipment for spraying molten metal; decorative work, building up worn machine parts, etc. Metallizing Co. of America, 135 Cedar St., New York.

Moldarta: Molding compounds. Westinghouse Electric Corp., East Pittsburgh, Pa.

Molduko: Foundry core and mold washes. Superior Flake Graphite Co., 1533 First National Bank Bldg., Chicago.

Molegrain: Alloy cast iron. Berted Foundry Co., Columbiana, Ohio.

Molex: Arcwelding electrode for steel; corresponds to AWS E-7010. Metal & Thermit Corp., 120 Broadway, New York 5.

Molin Metal: Aluminum-bronze alloy sand and permanent-mold castings, and drop hammer forgings for welding machinery, wiping and garnish mold dies, etc. American Art Alloys, Inc., 1142 S. Main St., Kokomo, Ind.

Mo-Lo: Cast iron for piston rings, cylinder liners, bushings. C. M. Lovsted & Co. Inc., 2214 First Ave., So. Seattle 4.

Moly: Hand and power hacksaw blades. Clemson Bros. Inc., Middletown, N. Y.

Molybdie: Cr-Ni-Mo alloy steels for piston rods, cutlery dies. A. Finkl & Sons, 2011 N. Southport St., Chicago.

Moly Black: For plating black finishes of a molybdenum-nickel complex from an acid solution; bath has abnormally high throwing power; undercoats of cadmium or zinc are recommended. E. I. du Pont de Nemours & Co. Inc., Wilmington 98, Del.

Moly-C-Alloy: Arcwelding electrodes for steel. Anthony Carlin Co., 2717 E. 75th St., Cleveland 4.

Moly-Iron: Alloy cast iron with 1 Mo, 1 Cr for heat and abrasion-resistant castings. Weatherly Foundry & Mfg. Co., Weatherly, Pa.

Molymet: Special Ni-Fe-Mo alloy for radio grid wire. Wilbur B. Driver Co., Newark, N. J.

Moly-Nickel: Steel welding rods. Black Drill Co., 1400 E. 222 St., Cleveland.

Mo-Mang: Free-flowing, very tough, Mn-Mo steel work-hardening to 500 Brinell. For straight build-up welding of worn manganese steel, carbon steel or gray-iron parts, such as bucket lips, crusher jaws, etc. American Manganese Steel Div., American Brake Shoe & Foundry Co., 389 E. 14th St., Chicago Heights, Ill.

Monarch: Bearing bronzes of various high-lead combinations; high hardness and compression resistance in cases of lubrication failure. Monarch Alloys Co., Ravenna, Ohio.

Monarch: Premium quality rubber products for extra-heavy service. Hewitt Rubber Corp., Buffalo 5.

Monarch Metal: Leaded Cu alloy for bearings. Monarch Alloy Co., Ravenna, Ohio.

Monarch Sling: Sling made of a single part of Monarch Whyte strand wire rope. Macwhyte Co., 2911 14th Ave., Kenosha, Wis.

Monarch Whyte Strand: Wire rope, made of improved plow steel. Macwhyte Co., 2911 14th Ave., Kenosha, Wis.

Mond: Similar to Monel metal (26 Cu, 70 Ni, 4 Mn); for turbine blades, pump rods, valve stems. Mond Nickel Co., Ltd., London, England.

Mond Nickel: 70-26 Ni-Cu with 4 Mn for resistance wires, chemical and mining machinery. Mond Nickel Co., Ltd., London, England.

Monel: 66 pct Ni, 33 pct Cu general purpose alloy with high corrosion resistance, strength, hardness and toughness, attractive silvery white color; for all types of equipment and parts requiring a rustless, corrosion-resistant material with rigidity, strength and toughness. International Nickel Co., 67 Wall St., New York.

Monex: X-ray apparatus. Westinghouse Electric Corp., East Pittsburgh, Pa.

Monimax: Nickel-molybdenum core material, high permeability at low densities, very low core losses; for moderately low densities and high frequencies. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22.

Monitor: Narrow-faced power-driven brushing wheel sections for cleaning, deburring, descaling and finishing metal parts and surfaces. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Monitor: Wire rope, woven wire fence. American Steel & Wire Co., Cleveland 13.

Mono-Cast: Centrifugal method of casting iron pipe. American Cast Iron Pipe Co., Birmingham 2.

Mono-Chrome: Firebrick. Mexico Refractories Co., Mexico, Mo.

Monoclase: Periclase ramming mixture for construction and maintenance of furnace linings. E. J. Lavino & Co., 1528 Walnut St., Philadelphia 2.

Mono-Fibrik: Super-duty plastic firebrick for complete one-piece furnace linings, repairs, building arches, front walls, ports. Mexico Refractories Co., Mexico, Mo.

Monogas: Gas generators. Westinghouse Electric Corp., East Pittsburgh, Pa.

Mono-Line: Plastic fire brick for monolithic furnace linings. Quigley Co. Inc., 527 Fifth Ave., New York 17.

Monorail: Overhead lift and carrying systems. American Monorail Co., 13103 Athens Ave., Cleveland 7.

Monoset: For grinding small intricate cutters, or fashioning them from the solid material. Cincinnati Milling Machine Co., Marburg Ave., Cincinnati.

MonoTractor: See Monorail.

Monoveyor: Monorail conveyors. Mechanical Handling Systems, Inc., 4602 Nancy Ave., Detroit 12.

Montegal: Aluminum alloy with Mg-Si-Ca, for light-alloy parts. Metallgesellschaft, A.G., Frankfurt, Germany.

Moonstone Bronze: Free-cutting bronze for instrument terminals. Thos. Bolton & Sons, Widnes, England.

Moore: Jig borers, grinders. Moore Special Tool Co. Inc., 742 Union Ave., Bridgeport, Conn.

Moore: See Lectromelt.

Moraine: Sintered Cu alloy for bearings. Moraine Products Co., Div. General Motors Corp., Dayton.

More-Jones: Babbitt alloy for bearings under varying stresses. More-Jones Brass & Metal Co., 4930 Manchester St., St. Louis.

Mo-Rex: Firebrick. Mexico Refractories Co., Mexico, Mo.

Morflex: Flexible coupling that drives through Neoprene biscuits, dampens vibration, eliminates noise; needs no protection from atmospheric conditions, water, dirt, or grit and requires no lubrication. Morse Chain Co., Div. of Borg-Warner, Detroit 8.

Morganite: Carbon-graphic combination resulting in a self-lubricating material capable of operation as a bearing, rotary seal, steam joint packing ring, mold, etc., where high temperatures are encountered or where lubrication is a problem. Morganite Brush Co. Inc., 33-02 48th Ave., Long Island City 1, N. Y.

Morgoil: Roll neck bearings. Morgan Construction Co., Worcester.

Morrison Airstream: Centrifugal Blower wheels, forward curved multi-blade, for manufacturers of air conditioning equipment, forced warm air furnaces, evaporative coolers. Morrison Products, Inc., 16816 Waterloo Rd., Cleveland 10.

Moslo: Complete line of welding-rod processing equipment. Moslo Machinery Co., 2443 Prospect Ave., Cleveland 15.

Mo-Steel: Series of Mo-Cr-Mn steels for crank shafts, steering knuckles, front axles, gears, crank pins. Climax Molybdenum Co., 500 Fifth Ave., New York.

Motal: Aluminum alloy for sand casting, automobile parts, motor housing. Aluminiumwerke Maulbronn, Maulbronn, Germany.

Mo-Technickill: Used for heavy duty rollers. Mackintosh-Hemphill Co., Pittsburgh.

Motelec: Motor grade electrical steel sheets. Empire Steel Corp., Mansfield, Ohio.

Motobloc: Continuous or single-hole cold-drawing equipment, for tubes, bar or wire. Vaughn Machinery Co., Cuyahoga Falls, Ohio.

Motoblox: See Motobloc.

Motoreducers: Motorized speed reducers. Falk Corp., 3013 W. Canal St., Milwaukee.

Mot-O-Trol: Electronic drive controls. Westinghouse Electric Corp., E. Pittsburgh.

Moulimphy: Alloy for glass molds. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. Y. Ferner Co., Investment Bldg., Washington.

MRCO: Copper powder for pressing into self-lubricating bushings, electrical contacts, motor and generator brushes, filters, grinding wheels, etc.; iron powder for pressing into bearings, friction parts, grinding wheels, electric pole pieces, magnetic cores, machine parts, etc.; lead powder for use in producing bearings, greases, paint pigments, plastic fillers, etc., and in chemical applications. Metals Refining Co., Div. of Glidden Co., Hammond, Ind.

M.S.A.: All types of mine and industrial safety equipment, masks, clothing, respirators, goggles, etc. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Mtu: Silica brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Mulboro: Portable mullers for foundries. Beardsley & Piper Co., 2539 N. Keeler St., Chicago.

Mueller: Corrosion resisting brass with 37 Zn and 5 Si-Mn; for bearings, connecting rods, worms, bushings. Mueller Brass Co., Riggin & Charles Sts., Port Huron, Mich.

Mullfrax: Electric-furnace mullite super refractories for piers, support arches and other load bearing constructions and linings for indirect electric furnaces melting both ferrous and nonferrous metals. Carborundum Co., Refractories Div., Perth Amboy, N. J.

Mulsine: Cold spray grease remover. Turco Products, Inc., Los Angeles 54.

Mult-Au-Matic: Multi-spindle automatic machine for drilling, boring, turning, facing and reaming machine parts. Bullard Co., Bridgeport 2, Conn.

Multichek: Multiple checking instrument utilizing one or more or a combination of Electricheks, Electrigages and Precisionaires. Sheffield Corp., Box 893, Dayton 1.

Multiclone: Dust collectors. Western Precipitation Corp., 1009 W. 9th St., Los Angeles.

Multigrip: Rolled steel floor plate of non-skid design. Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30.

Multi-Low-Range: Portable universal testing machine for tensile compression, transverse and shear; calibrated in ounces, range from 0 to 100 lb. W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44.

Multiple Spray: Fuel oil burners. Industrial Heating Equipment Co., 3570 Fremont Place, Detroit 7.

Multipress: Bench size hydraulic press, manual or automatic controls, featuring vibratory HydrOILic pressure. Denison Engineering Co., 1160 Dublin Rd., Columbus.

Multi-Range: Arc-welding controls and welding equipment. Hobart Brothers Co., Hobart Sq., Troy, Ohio.

Multirol: Bearings. McGill Mfg. Co., Inc., 1102 N. Lafayette St., Valparaiso, Ind.

Multi-Roll: Belt conveyor idlers. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Multiseal: Solid metal gasket having raised cross-ribs. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Multi-Stamp Holder: Safe and legible stamping of several characters in rapid succession. Jas. H. Matthews & Co., 3942 Forbes St., Pittsburgh 13.

Multi-Unit-Press: Adjustable packaged HydrOILic power, Flexible-use frame with manual or automatic models, 4 and 6 ton capacity. Denison Engineering Co., 1160 Dublin Rd., Columbus.

Multival: Multiple measuring valve block to deliver lubricant to a group of bearings from one portable grease gun connection. Farval Corp., 3249 E. 80th St., Cleveland 4.

Multivane: Centrifugal fans. Westinghouse Electric Corp., East Pittsburgh, Pa.

Multi-V-Drive: V Belt drives. Worthington Pump & Machinery Corp., Harrison, N. J.

Multi-Wash: Collector equipment using wet principle, for handling dust, fumes and vapors in foundries, metal, chemical and processing plants and food processing. Claude B. Schneible Co., 2827 25th St., Detroit 16.

Multronic Capacitrol: Multi-positioning electronic controller for applications requiring indication and control of temperature, voltage, current, signalling and similar variables. Wheelco Instruments Co., Chicago 7.

Mumetal: High-nickel magnetic core material; high permeability at low flux density; for extremely low densities and high frequencies. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Mu-Metal: Nickel alloys with Fe, Cu, Cr or Mn for submarine cables, current transformers. Telegraph Construction & Maintenance Co., Ltd., London, England.

Mundt: Perforated metals of all types. Charles Mundt & Sons, 50 Fairmount Ave., Jersey City.

Mungoose: 18 Ni nickel-silver for domestic utensils, ornaments. Barker & Allen, Ltd., Birmingham, England.

Munning: Chemical in combination for electroplating solution; chemical in combination for electroplating solution detergents. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Muntz Metal: 60-40 copper zinc for bolts, pins, spindles, wire, condenser tubes. Muntz Metal Co., Birmingham, England.

Murco: Portable machine for grinding sand core faces before pasting cores together. D. J. Murray Mfg. Co., Wausau, Wis.

Murex: Series of arcwelding electrodes for armor plate and stainless steel. Metal & Thermit Corp., 120 Broadway, New York 5.

Murex Alternex: Coated mild steel rod for manual arc welding of light and heavy-gage steel products in all positions, with transformer type a.c. machines. Metal & Thermit Corp., Equitable Bldg., New York.

Mushet Self Hardening Steel: Self-hardening 7 W, 1.7 Mn steel for tools and dies. Samuel Osborn & Co. Ltd., Sheffield, England.

—N—

N Brale: Sphero-conical diamond penetrator ground to micrometric precision especially at the extreme tip for testing hard steel. Wilson Mechanical Instrument Co., 383 Concord Ave., New York 54.

N A: Corrosion and heat-resistant chrome-nickel-iron alloys, for furnace parts, pipes, valves. National Alloy Steel Co., Blawnox, Pa.

Nacconal NR: Alkyl-aryl-sodium-sulphate synthetic organic detergent, stable in acid and alkaline solutions and in presence of metal salts. Used for washing metal and in pickling baths. National Aniline Div. of Allied Chemical & Dye Corp., 42 Rector St., New York.

Naco: Specially treated steel castings. National Malleable & Steel Castings Co., Cleveland 6.

Naco Steel: 1.5 Mn steel for car coupler knuckles, car wheels, anchor chains. National Malleable & Steel Castings Co., Quincy & Reservoir Aves., Cleveland.

Nada "C": 95.75 Cu, 3.25 Si, 1.0 Sn corrosion-resistant bronze possessing high strength and good ductility, for sand castings. Nassau Smelting & Refining Co., 1441 Willard St., Tottenville, S. I., N. Y.

Nada Nt: 87 Cu, 3.75 Ni, 3.75 Sn, 0.75 Pb, 4.75 Zn bronze casting-alloy of solid solution type; for pressure and structural castings. Nassau Smelting and Refining Co., 1443 Willard St., Tottenville, S. I., N. Y.

Nalco Densimeter: Device for measuring boiler water concentration by the density method. National Aluminate Corp., 6216 W. 66th Place, Chicago 38.

Nalco System: Controlled, scientific method of water treatment for industry. National Aluminate Corp., 6216 W. 66th Place, Chicago 38.

Namco: Centrifuges for industrial clarifying and separating; solenoid-counters. National Acme Co., 170 E. 131st St., Cleveland 8.

Nap: Additive agent for pickling baths to save acid. Wm. M. Parkin Co., 1102 Highland Bldg., Pittsburgh 6.

Narcal: Alumina-diaspore fireclay brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Narco: Ground and screened fire clay; super duty fireclay brick; dry heat-setting high-temperature fireclay mortar; dry, air-setting high-temperature fireclay mortar; plastic and castable refractories. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Narcocrete: Insulating castable refractory. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Narcoset: Wet, air-setting high-temperature mortar. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Narco-Sil: Super duty silica mortar. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Natco: Automatic power clamps for machining operations. National Automatic Tool Co., Richmond, Ind.

Natco: Ladle sleeves, nozzles, foundry gates, runners. National Fireproofing Co., Pittsburgh 12.

National: See Acheson.

National: Conveyor belts. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

National: Industrial oxygen and acetylene. National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6.

National: Portable and stationary gas-cutting machines; gas-welding rods and welding accessories. National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6.

National: Railway journal boxes, friction draft gears, yokes, engine coupler pockets, railway trucks and side frames. National Malleable & Steel Castings Co., Cleveland 6.

National: Series of welding and brazing fluxes for cast iron, brass, bronze, copper, steel, malleable iron, aluminum and its alloys. National Cylinder Gas Co., 207 W. Wacker Dr., Chicago 6.

National: Steel posts; guard rails; fence stretcher and post driver; wire fence. American Steel & Wire Co., Cleveland 13.

Nationalloy: Series of stainless steels for chemical engineering equipment. National Forge & Ordnance Co., Irvine, Pa.

N-A-X: Low-alloy structural steels. National Steel Corp., Pittsburgh.

N-A-X High Tensile Steel: Low-alloy, high-strength, fine-grained steel, good weldability with high ductility, great impact and corrosion resistance. Great Lakes Steel Corp., Alloy Div., Ecorse, Detroit 18.

N-A-X 9100: 0.08 to 0.70 C, 0.60 to 0.75 Mn, 0.60 to 0.90 Si, 0.0 to 0.20 Mo, 0.10 to 0.20 Zr general purpose steel, used as mild alloy steel wherever optimum impact and fatigue values are required; as carburizing grades of controlled hardenability for gears, pins, shafts, etc.; structural grades may replace highly-alloyed steel. Great Lakes Steel Corp., Ecorse, Mich.

N-A-X 9100 Series Alloys: Alloy steel sheets, plates and bars supplied for carburized and thoroughly hardened parts; furnished in carbon content up to 0.70 pct. Great Lakes Steel Corp., Detroit 18.

N-A-X 9100 Series Steels: All-purpose, low-alloy steels. Great Lakes Steel Corp., Alloy Div., Ecorse, Detroit 18.

N-A-Xtra High-Strength: Alloy steel sheets

and plates, heat-treated to strengths up to 150,000 psi yield strength. Great Lakes Steel Corp., Detroit 18.

N-B-M Bronze: Bronze castings. American Brake Shoe Co., 230 Park Ave., New York 17.

Neloy: Series of alloyed steels for castings. National Erie Corp., Erie, Pa.

Neloy Molybdenum: Annealed steel for steel castings. National Erie Corp., 1521 Raspberry St., Erie, Pa.

Nelson: Automatic stud welding equipment. Nelson Stud Welding Corp., Lorain, Ohio.

Nelson-Bohnalite: Aluminum alloy with 10 Cu, Si, Mg, Ni; for pistons in internal combustion engines. Karl Schmidt Co., Neckarsulm, Germany.

Neochran: Corrosion-resistant steel with 22-30 Cr, 0.5-2.5 Si and 1.0-1.5 C for general use. Skoda Works, Prague, Czechoslovakia.

Neowhite: White frit with 13 to 15 pct Ti 0z; high capacity. Pemco Corp., Eastern & Pemco Aves., Baltimore.

Nepsco: Metal stampings, specialties, appliances. New England Pressed Steel Co., Natick, Mass.

Nergandin: 70-28 brass with 2 Pb for condenser tubes. Muntz's Metal Co., Birmingham, England; Imperial Chemical Industries Ltd., Birmingham, England.

Nes: Extension, compression and torsion springs, wire forms. New England Spring Mfg. Co., Unionville, Conn.

Neusilber: 60 Cu alloy with 25 Ni, 15 Zn for deep drawing, knives, fittings, jewelry. Vereinigte Deutsche Nickelwerke A.G., Schwerte, Germany.

Neutragrog: Accurately screened chrome ore grog or grit; used with refractory bonding cements to make or cast rammed furnace linings. E. J. Lavino & Co., 1523 Walnut St., Philadelphia 2.

Neutralene: Heat-treating atmosphere, free of carbon dioxide and moisture. General Electric Co., Schenectady.

Neutralloy: Corrosion and stain-resistant Ni alloy with Cr-Fe-Si-Ti-Mn, for castings. F. B. Oldham & Co., 631 Niagara Ave., Buffalo.

Nevastain: Complete series of stainless steels for corrosion and heat resistance in turbine blades, cutlery, furnace parts. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Neverslip: Rolled steel floor plate. Pine Iron Works Co., Commercial Trust Bldg., Philadelphia 2.

Neverstick: Stiff, heavy grease used for lubrication of ground key work, such as corporation stops, stove cocks, etc. United Oil Mfg. Co., 1429-31 Walnut St., Erie, Pa.

New Century: Railroad switch stand for use with 60 lb. rails and over, on main lines, branch lines, and in yards. Bethlehem Steel Co., Bethlehem.

New Flo: Firebrick in soft, medium or hard burn. Chicago Fire Brick Co., 1467 Elston Ave., Chicago 22.

New Kathode: Steel welding electrode for mild steel. Lincoln Electric Co., 12818 Coit Rd., Cleveland.

New Lightweld: Straight-carbon coated steel welding electrodes. Lincoln Electric Co., 12818 Coit Rd., Cleveland.

New Process: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

Newark-Gear: Gear cutting machines. Newark Gear Cutting Machine Co., Newark 5, N. J.

Newloy: Copper alloy with 35 Ni and 1 Sn for tableware and resistance wire. Harrison, Fischer & Co., Ltd., Sheffield, England.

Newport: Series of Si-Fe alloys for electric generators, transformers. Newport Rolling Mill Co., Newport, Ky.

Ney Oro: 73-78 Au-Pt alloys with Cu-Ag-Zn; for dental alloy applications. J. M. Ney Co., 9 Elm St., Hartford.

Neydium: Gold-platinum alloys with Cu-Ag-Zn for dental applications. J. M. Ney Co., 9 Elm St., Hartford, Conn.

• In order to assure the accuracy and completeness of this directory, manufacturers and suppliers serving the metalworking industry are requested to check the trade names appearing in this and succeeding issues and to advise THE IRON AGE of any omissions or errors. These changes will be incorporated in the first reprint made for general distribution. Communications should be addressed to THE IRON AGE, 100 E. 42nd St., New York 17. Attention Trade Name Directory.

Ney's No. 125: Alloy used for dental amalgam. J. M. Ney Co., Hartford.

Ni Chillite: Chilled iron with Ni-Cr-Mo for rolls. Mackintosh-Hemphill Co., Pittsburgh.

Niag: Nonferrous alloy in the so-called nickel silver group. Mueller Brass Co., Port Huron, Mich.

Niagara: Pump type and paddle-wheel washers for cleaning metal parts prior to electroplating, anodizing, japanning, etc. G. S. Blakeslee & Co., 19th St. & 52nd Ave., Cicero Station, Chicago 50.

Niagara Brand: Series of ferroalloys, ferro-Cr, ferro-Si and ferro-Mn-Si, for use in the production of alloy steels. Pittsburgh Metallurgical Co., Inc., 3801 Highland Ave., Niagara Falls, N. Y.

Niagara Emery: For grinding, polishing, tumbling, sandblasting and for wear-resisting floors. Keystone Emery Mills, 4329 Paul St., Philadelphia 24.

Ni-Bar Iron: 1.5 Nickel, Cr-Si-Mn cast iron for grate bars, stocker links. Athens Foundry Co., Athens, Pa.

Nicaloi: 47 Ni-Fe alloy for armature punchings, electrical machinery and motors. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Nicaloy: 49-51 nickel-iron resistance alloy for electrical equipment and apparatus. General Electric Co., Schenectady.

Nicalun: Wear-resistant Ni-Cu cast alloy with abrasive grains embedded, for elevator door sills, stair treads. American Abrasive Metals Co., Irvington, N. J.

Ni-Carb: Process for surface hardening of steel, suited to either batch or continuous methods; work may be hardened by either slow-cooling or quenching, as desired. American Gas Furnace Co., Elizabeth, N. J.

Nichrome: Series of alloys containing from 65 to 85 Ni 11-22 Cr, Fe, Mn, Si for electrical resistances, heating elements, annealing pots. Driver-Harris Co., Harrison, N. J.

Nickel Babbitt Metal: A nickel babbitt resistant to extreme heat and very heavy bearing loads. Magnolia Metal Co., 18 W. Jersey St., Elizabeth 4, N. J.

Nickel Fluoborate: A high-speed acid nickel electroplating solution. General Chemical Co., 40 Rector St., New York 6.

Nickel Phosphor Bronze: 98.68 Cu, 1.10 Ni, 0.22 P wire and strip with high conductivity, high strength, high fatigue resistance; for high-strength conductors and springs. Chase Brass & Copper Co., Waterbury, Conn.

Nickel-Arc: Electrode specifically designed for producing machinable welds on cast iron. Alloy Rods Co., York, Pa.

Nickel-Arc: See Arcaloy.

Nickelchromeight: Welding electrode for 18-8 stainless steel. Westinghouse Electric Corp., East Pittsburgh.

Nickelchromtwelve: Welding electrode for 25/12 stainless steel. Westinghouse Electric Corp., East Pittsburgh.

Nickelchromweld: Ni-Cr steel welding electrode. Lincoln Electric Co., 12818 Coit Rd., Cleveland.

Nickeldur: Nickel bronze with 10 Pb, 5 Sn, 5 Ni for centrifugally-cast liners. Janney Cylinder Co., 8037 Frankford Ave., Philadelphia.

Nickelend: Ni weld metal. Arcos Corp., 1515 Locust St., Philadelphia.

Nickelin: Series of nickel-copper alloys ranging between 10-33.3 Ni; for wires, fruit presses, coinage, chemical apparatus. Vereinigte Deutsche Nickelwerke A.G., Schwerte, Germany.

Nickeline: Tin babbitt for bearings. National Lead Co., 113 Broadway, New York.

Nickelmang: Bare and coated welding electrode for Mn steel. Westinghouse Electric Corp., East Pittsburgh.

Nickeloid: Babbitt metal for bearings. Pacific Metal Co., 305 N. W. Park Ave., Portland, Ore.

Nickeloid: Copper-nickel alloy for valves for severe steam service. William McPhail & Sons, Glasgow, Scotland.

Nickel-Silic-On: Nickel-silicon alloy for use in pistons. Silicum Pistons, Ltd., London, England.

Nickhal Steel: 39 Ni Steel for valves, thermostats. Jessop Steel Co., Washington, Pa.

Nickrotherm: Heat and corrosion-resistant alloys of iron with Cr-Ni or Cr-Si; for muffles, autoclaves, roasting furnaces, grates. Fried. Krupp. A.G., Essen, Germany.

Nic-Motal: Babbitt metal for bearings. J. T. Wing & Co., 300 Bates St., Detroit.

Nico: Cast iron welding electrodes. C. E. Phillips & Co., 324 S. Jefferson Ave., Chicago.

Nico: Rust-resistant Cu-Ni steel for corrugated culverts. Northfield Iron Co., Northfield, Minn.

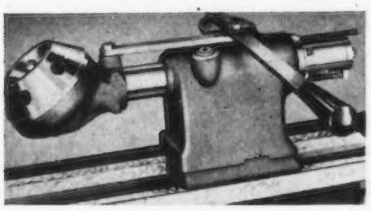
(Continued on page 154)

New Equipment . . .

Small Tools and Gages

New models and developments in turret heads, dressing and indexing fixtures, speed changers, end and face mills, die heads and threading tools are described among the announcements in this week's review, which also includes gages for measuring angles and thickness of materials, micrometers and dial indicators.

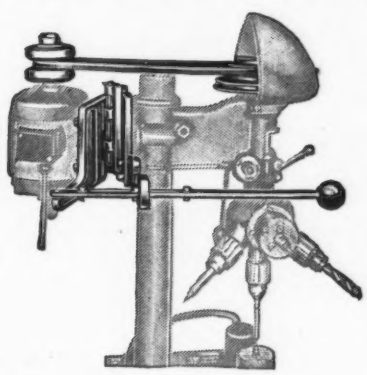
[1] Made by the *South Bend Lathe Works*, 381 E. Madison St., South Bend 22, Ind., for use on their 9-in. precision lathes, a tailstock type handlever turret has been announced for use on jobs requiring a number of successive operations. This turret mounts on



the inside ways of the bed of the lathe in place of the tailstock. The six station turret head accommodates tools with ⅝-in. diam shanks. Length of the cut at each station is regulated by means of an adjustable set screw. Stop mechanism is geared to operate automatically in unison with the indexing of the turret head. The index lock releases automatically at the end of the turret slide's return stroke and indexing is done by hand. Operations can be repeated or skipped, at will. Turret slide has a maximum stroke of 3¼ in.

Speed Changer

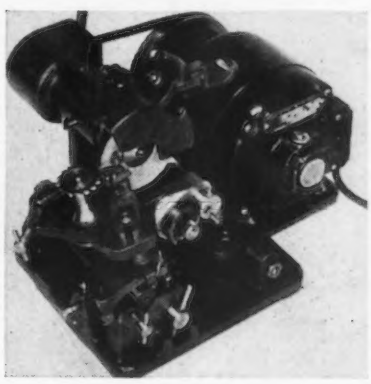
[2] Obtaining correct drilling and tapping speeds on all drill presses without having to change



belts or stop motor can be accomplished, it is said, with an instant speed changer manufactured by the *Chicago Drillet Corp.*, 1729 N. Winchester Ave., Chicago 22. All that is necessary is to touch a lever and the tool turns at the required speed. The speed changer can be set for any range of speeds desired. A standard four-step cone V-belt pulley will have a speed range from 435 to 4550 rpm. The speed changer, engineered so that all steps of the pulley can be used, can be installed on any make of drill press, it is said, in a few minutes.

Dressing Attachment

[3] For use on its Waltham cutter sharpener, the Angle-true attachment has been developed by the *Edward Blake Co.*, 634 Commonwealth Ave., Newton Centre, Mass.



The face of the dish wheel used on this machine is dressed by the standard-equipment diamond and the attachment provides a second diamond for dressing the back and the periphery to any desired combination of angles. With the wheel formed to exactly the desired shape deepening the gash and sharpening the face are performed in the same operation. This is said to be especially advantageous when sharpening cutters having a large number of teeth. The attachment increases the scope of the Waltham cutter sharpener which is used for sharpening gear and thread milling cutters, circular form tools and multiple cutters.

Sharpening Fixture

[4] To provide a convenient and accurate means for rapidly sharpening and checking the sharpening of circular form tools, a special fixture has been announced by

Hardinge Brothers, Inc., Elmira, N. Y. It is readily applied to the table of any standard tool grinder. Circular form tools are applied to the fixture and the tool sharpened and the sharpening checked without removing the tool from the fixture or tool grinder thus eliminating, it is said, the ordinary cut and try methods. The fixture is built in only one size as it can be used to sharpen and check the full range of circular form tools found in general use.

Indexing Fixture

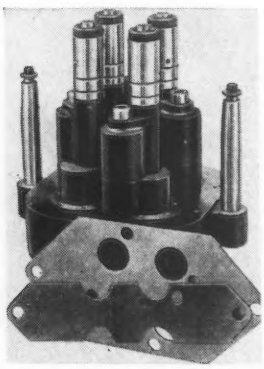
[5] A collet indexing fixture constructed to hold work for milling, grinding, drilling and shaper

operations has been announced by *G & H Mfg. Co.*, 327 Elm St., Fitchburg, Mass. The fixture can be positioned either horizontally or vertically on the machine work table with equal facility, it is said.

Stock does not change position during collet closing action, which is important when length tolerances are close. Removable screw-insert stop buttons are used to block out unwanted indexing stations in a particular setup. Index plates are likewise removable. A chip clearance hole extends through the entire depth of the fixture offering a ready exit for chips. Collets used in Brown & Sharpe automatics and wire feed screw machines are often specified for the indexing fixture, but other types of draw-in and push-out collets can be used when desired.

Multiple Drill Head

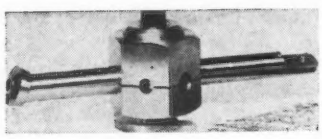
6 In multiple, adjustable drill heads manufactured by the *Wisconsin Drill Head Co., Ltd.*, and



distributed through Strutz & Mead, Inc., 1225 N. Water St., Milwaukee 2, each drill revolves around two different centers, each with 15/16 in. radius. Each drill point can be located and locked at any point in the area of a 3¾ in. circle. As each circle overlaps at least one other circle, the variety of hole patterns which can be produced is limited only by the number of spindles employed and the combined area of the various spindle circles. Another feature of the quick change drill head, which is entirely gear driven, is that a set of templates, a positioning template and a locking template, is furnished with each for every hole-pattern or bolt circle to be drilled. The drill head is made in standard models with 2 to 6 spindles; all spindles in a particular head do not have to be used in each setup. Minimum centers are 1⅛ in. and maximum bolt circles are 8¾ in. in diam.

Turning and Facing Tool

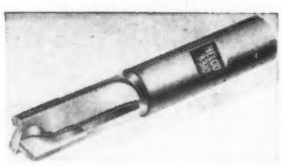
7 Known as the Shearcutter, a boring, facing and turning tool with a precision tool holder, for use on lathes, screw machines, drill presses and boring machines has been announced by the *Fearless Tool Co.*, 1234 S. Gramercy Place, Los Angeles 6. The outstanding feature of this tool is the circular cutter bit which is said to utilize a new technique in cutting metal. The penetration angle is such that a shearing action is attained and as a result of this knife-



like action mirror finishes are produced and it is claimed that there is a great reduction in the frictional heat produced by conventional tools. Twenty to 50 new, sharp cutting edges may be presented to the work by simply rotating the bit thus eliminating the necessity of stopping production at frequent intervals to resharpen the tools. The bit can be resharpened in 1 min. The life of the cutting edge is said to be greater than that of conventional tools because of the shearing action and the way in which the clip slides back over the cutting edge thus tending to keep it sharp.

End Mill

8 Development of a Carboloy-tipped three-flute end mill has been announced by the *Nelco Tool Co., Inc.*, 370 Hamilton Ave., Brooklyn 31. This mill is claimed to be capable of plunging into solid metal, and has proved effective in



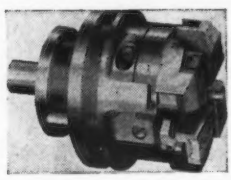
the milling of plastics. It provides more chiproom thus obtaining cooler and freer milling, which lessens chance of work overheating and twisting. The new end mill is manufactured for use on all types of alloy steel, cast iron, brass, bronze, and plastic material. Sizes range from ⅜ to 2 in. diam.

End Mills and Holders

9 Selch end-mills and holders have been announced by the *Galanot Products Co.*, 883 S. Union Ave., Alliance, Ohio, which are said to provide better concentricity, faster cutting speeds, and absolute conical grip. Concentric grinding to 0.0005 in. of the two tapered cones on the cutting tool and concentric grinding of the female cones on holder and cap provide equal cutting depth and load on each flute of the cutter, it is reported. Hexagon positive drive on the perimeter of the cutter provides rigidity. The double cone mounting prevents slipping of the cutter away from the work or gouging into the work. One cut precision width slots are possible with smoothness of finish predominating.

Die Head

10 Development of a 9/16-in. Lanco taper attachment die head having a capacity of ⅛ to ½-in. standard pipe thread has been announced by *Landis Machine Co.*, Waynesboro, Pa. The die head is of the rotary type and adaptable to any machine having either a lead screw or lead cam. It can be furnished with special shank and

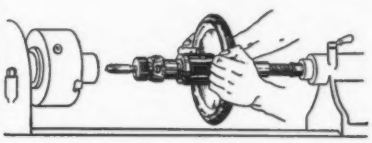


flange required for adapting it to different machines. Tapered threads are generated with the die head the same as straight threads in that they are formed with the chaser throat. The taper attachment model fitted with alternating tooth tangential pipe chasers can be successfully used for threading stainless steel, it is said. The combination of die head and alternating tooth chasers, prevents tearing on the crest of the thread since the chip is formed only on one side angle of the thread.

Threading Tool

11 Said to permit threading and tapping at high speeds in a lathe with safety to tools and operator, a hand tool, known as the Grip-Slide threading and tapping tool, has been developed by the *Thread Miller Corp.*, West Orange, N. J. It eliminates the hazard of projecting tap or die holder handles, speeds threading operations by permitting higher lathe speeds, and is easy to operate. The tool can be used for cutting either right or left

hand threads. One advantage claimed for the tool is that it eliminates the necessity for moving the tailstock back and forth when threading or tapping work in the lathe. The die or tap holder is a hardened and ground piece having the bore for the guide bar concen-



tric with the recess in which the die or tap is held, giving perfect alignment of the die or tap with the work held in the chuck of the lathe. The Regular has a capacity for external threading from 2-56 to ⅜ in. NC on steel to a thread length of 3½ in. and the Giant from 10-32 to 9/16 in. NC and ¾ in. NF to a thread length of 5½ in. Tapping capacity of the smaller unit is 2-56 to 5/16-18 and the larger 10-32 to ⅝-11, both sizes using 2 or 3-flute spiral taps.

Threading Tools

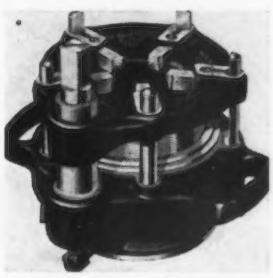
12 Announcement of a line of standard carbide tipped threading tools, Style M-15, has been made by *Metro Tool & Gage Co.*, 4240 W. Peterson Ave., Chicago 30. These tools are of the 60° V-nose type. Primary clearance at the nose is 3°, with a secondary clearance of 6°. Tips are made of tough, wear-resistant grade of carbide particularly suitable for long run threading of steel parts.

Hand Threading Tool

13 Providing a simple and quick means of threading close or special length pipe nipples on the job, a nipple guide and pipe chuck have been manufactured by *Wing Laboratory*, Grass Lake, Mich. It comes in sizes for ⅛, ¼, ⅜, ½, ¾ and 1-in. standard pipe. In use the nipple guide is pushed through and the tapered threads are screwed by hand or gently with a pipe wrench, into the half-completed pipe nipple held in the pipe chuck. The nipple screws in farther than in a standard pipe fitting, it is said, up to an adjustable stop which after threading is released with a wrench and the completed nipple is turned out with the fingers. The pipe chuck holds pipe of any length for threading. It is said the same accuracy can be expected as when cutting threads in the usual way, but when needed to connect runs of pipe out of line, threads can be made at an angle.

Pipe Threader

14 A quick-setting workholder and balanced loop handles are two innovations of the new 4P geared pipe threader announced by the *Ridge Tool Co.*, Elyria, Ohio. With the workholder the threader can be set exactly to size before being placed on the pipe; once on the pipe only one screw needs to be tightened to hold it securely. All bushings have been eliminated. The balanced loop handles on the enclosed gear case are said to prevent slipping or tipping over, and facilitate handling. A twin-anchored drive shaft turns in oilless bronze bearings. The gear is fully enclosed, packed in grease, protected from dirt and wear. The new 4P is provided with four sets of five high-



speed steel dies to cut clean, accurate threads, standard or tapered, drip threads and short nipples. A ratchet handle is provided and a special rigid design universal drive shaft is available for power drive.

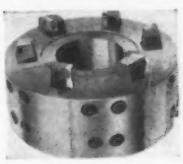
Arbors

15 Bearcat arbors, announced by the *Paxson Co.*, Dowagiac, Mich., may be mounted for grinding, polishing, buffing, sanding or abrasive disks, wood turning, non-

ferrous metal cutting, or for power transmission or idler pulley use. The shaft is 1½ in. between bearings, precision built and balanced to eliminate spring and vibration. Ball bearings are fully enclosed in dust-proof gray iron housings. Lubrication is through Alemite or Zerk connections. Belt pulley is keyed to the shaft with a set screw lock. Arbor shaft is furnished with 1 or 1⅛ in. between collars where tools are mounted.

Face Mill

16 Called the Cutsall, a face mill designed for modern milling practice has been announced by the *Lovejoy Tool Co.*, Springfield, Vt. It is a tool-bit-type mill with Carboloy cemented carbide blades and embodies such features as a housing built to take either left or right-hand blades, holding the blade face slightly back of center so that positive and negative radial rake can be obtained from the same blades. There are two set screws for each blade, one providing for fine blade adjustment; the other for locking the blade in the housing. Blades can be sharpened on an off-hand, adjustable table single-point tool grinder. Cutsall is available in 6, 8, 10 and 12-in. diam sizes. One size of Carboloy tipped blade fits all four cutter sizes. Blades are tipped with either of 2 grades of Carboloy; one for cutting steel or one for cutting cast iron and nonferrous metals.



Heavy Duty Drills

17 Heavy duty drills designed to give top performance on drilling operations in tough and hard materials such as heat treated steels up to 375 Bhn have been announced by the *Chicago-Latrobe Twist Drill Works*, 411 W. Ontario St., Chicago 10. Typical applications are in the drilling of plow beams, track shoes for tractors, cast steel wheel forgings, etc. Sizes range from ½ to 1½ in. diam, with all sizes furnished in the regular taper shank series.

Keyway Broaches

18 Announcement of standard keyway broaches in sizes from ⅛ to ½-in. keyways has been made by *Zagar Tool, Inc.*, 23880 Lakeland Blvd., Cleveland 17. Adapters to fit them are for broaching holes from ½ to 1¼ in. diam. Broaches

and adapters fit the 20-in. Zagar horizontal broaching machine.

Universal Fly Cutter

19 Longer service life and ready adaptability are features of a universal fly cutter introduced by the *Wendt-Sonis Co.*, Hannibal, Mo. The cutter is said to do all kinds of ordinary and step milling operations on all types of materials. Only one cutter body is needed to handle 75 pct of milling jobs, since the inserted teeth are easily interchangeable. Durability and savings in power are other important qualities of the new cutter. Blades may be easily removed for sharpening on an ordinary bench grinder.

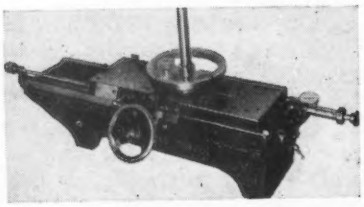
Clamped-on-Tip Tools

20 For lighter machining jobs, two new types of tools having clamped-on, advanceable Kennametal tips have been announced by

Kennametal, Inc., Latrobe, Pa. Styles 1CL and 2CL have offset shanks and styles 11CL and 12CL have straight shanks. Among the operating and maintenance advantages provided by these tools are more consistent performance and greater durability from thermally strain-free assembly and smooth, unimpeded chip flow assured by the clamping arrangement. Dull tips can be advanced and resharpened. Shanks serve as a permament tip holder and tips of different grades can be interchanged in the same shank. Tips can be supplied with permanent, molded-in chip breaker, constant in depth, but adjustable in width by varying the amount ground from end or side cutting edges. Shank sizes available include 1 x 1 x 7 in., 1 x 1¼ x 9 in., and 1 x 1½ x 10 in.

Gear Testers

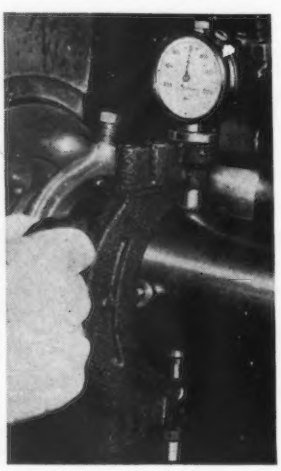
21 Two models of Parkson gear testers, both having a maximum capacity of 15-in. center dis-



tance have been put on the market by the *George Scherr Co.*, 200 Lafayette St., New York 12. One of the models is equipped with a box-shaped upright which carries an adjustable bracket with means for clamping it in any desired position, thus providing vertical centers for holding gears or pinions that are cut integral with their shafts or mounted on arbors. The second model, illustrated, has been designed for testing internal gears, either against the mating pinion or against a master. This model incorporates an arrangement whereby the pressure can be reversed at will and in this way both internal as well as external gears may be inspected equally efficiently for center distance, run-out, tooth thickness and rolling action. Both models embody a precision scale and oversize vernier for setting to correct center distance.

Snap Gage

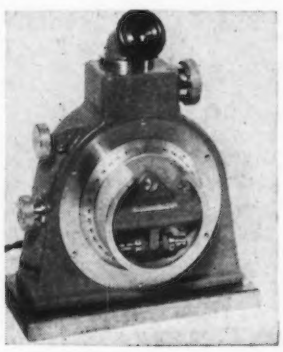
22 Demountable heads and extension spacers are features of the Decimatic dial snap gage an-



nounced by *Standard Gage Co.*, Poughkeepsie, N. Y. A single pair of heads and four extension spacers of different lengths cover the range of 4 in. Using a popular sized Decimatic indicator these instruments are said to show highly consistent repeatability, are free from whip and waver of the hand, and are easily set to a master. Both of the gaging pins are surfaced with cemented carbide to reduce wear. The lower, adjustable pin is flat while the upper one, which actuates the indicator, has a spherical surface. The gage is operated by passing it over the work piece and the greatest deflection of the hand is the reading. Smaller sizes of the gage may be used in a bench stand as a comparator.

Clinometer

23 Called the Microptic Precision Clinometer, a precision instrument which optically checks angles over the full 360° circle, to graduations of 0.05 min of arc, has been produced by the *Engis Equipment Co.*, 431 South Dearborn St.,

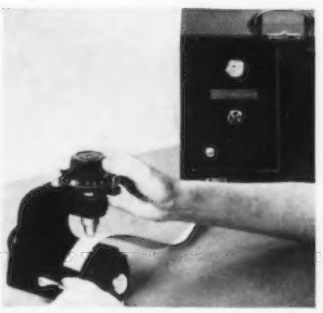


Chicago 5. It consists of a light alloy body containing a divided glass circle and an optical reading system. The instrument makes possible checking to the accuracy of a sine bar without using gage blocks, it is said. Another instrument featured by Engis is the Clinometer Model C, which checks pitches of propellers and plane surfaces of fuselages, wings and other locations to one minute accuracy.

Electronic Micrometers

24 Production of four redesigned models of electronic micrometers for precise thickness measurement in the shop or laboratory have been announced by the *Carson Micrometer Corp.*, 28 Edison Place, Newark 2. Outstanding feature is the electronic circuit used in conjunction with the micrometer screw thread, electronic discrimination replacing the human sense of touch. Unskilled operators are assured of consistently accurate

readings to 0.00005 in. on production testing lines. Originally developed for measuring drift and deflection in coil springs, these instruments will now measure thick-



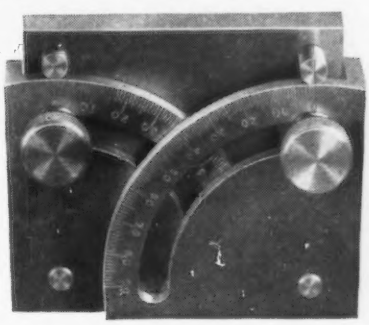
ness of compressible or noncompressible materials as well as conducting or nonconducting materials. It is said their precision is unaffected by variations in temperature, line-voltage, vibration or aging of electronic tubes, nor do they require leveling. The micrometers feature extreme sensitivity to deviations as small as 0.000025 in. over a full 1-in. range. Units are portable and weigh but 20 lb.

Angular Straight Edge

25 Added to the line of precision measuring equipment manufactured by *Machine Products Corp.*, 6775 E. McNichols Rd., Detroit 2, is an angular straight edge, made of heat-treated Meehanite in any size from 18 to 84 in. in length with any angle specified. Two faces are hand scraped. It was designed for machine builders and for machine rebuilding or repair work to simplify the task of scraping and checking of machine ways and slides. This angular straight edge can be used with or without handles at each end.

Universal Angle Protractor

26 Announcement has been made by *Willey's Carbide Tool Co.*, 1340 W. Vernor Highway, Detroit 1, of a universal angle protractor which, it is said, can be used on all makes of carbide tool grinders to provide a dual change of angles from 0° to 90°. This feature speeds up production by permitting the grinding of two tools simultaneously at the same or different angles. While designed primarily for



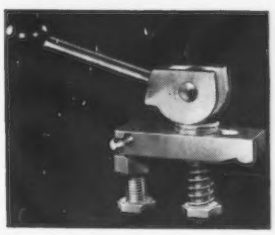
grinding applications it also lends itself to a variety of applications such as acting as an angular guide for drilling, grooving and milling.

Inside Micrometers

27 Measuring bores without removing boring bars is now possible with a tubular over-the-bar inside micrometer manufactured by the *Tubular Micrometer Co.*, St. James, Minn. Unlike conventional inside micrometers and rods which require removal of the boring bar and disturbing the cutter settings, this device may be used to determine bore sizes over or around center obstructions. The micrometers are made with hollow box type steel frames to provide lightness, and the frames have a vacuum in the center to insure minimum expansion and contraction. Frames are hydrogen brazed and are plated with copper, nickel and heavy chrome to resist wear and corrosion. The standard range of sizes is from 8 to 28 in. and will cover bar diameters from 4 to 8 in.

Fixture Clamps

28 Five fixture clamps for holding work pieces have been designed by *West Point Mfg. Co.*, Farmington, Mich. They have ground stud washers with ground spherical radii, allowing the clamp to float and so compensate for irregularities in the work. Clamps are made of heat treated alloy steel, cadmium plated. The five different types, all with quick action clamps, are



for different clamping methods. Each type is made in six sizes and is adjustable for height.

Dial Indicators

29 Three A size dial indicators having overall bezel diameter of 1¼ in., have been announced by *Federal Products Corp.*, 1144 Eddy St., Providence. These indicators are suitable for use where there is not space for a large indicator, or where the gage is portable and weight is a factor. Built with low friction full jeweled features, the indicators are said to be sensitive and accurate.

TIME-SAVER CARD for your convenience in obtaining, without obligation, more information on any one or more of the new equipment items featured on this and following page.

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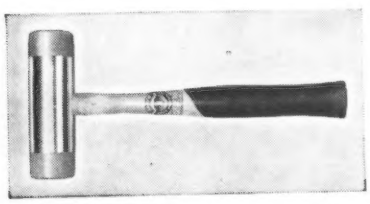
Vise Jaw Caps

30 Copper, brass or plastic vise jaw caps, called Softfaces, have been announced by *Gregory Tool & Mfg. Co.*, 5300 Tireman Ave., Detroit 4. The metal caps, ranging in sizes from 3 to 6 in., are made from mill bars which assures smooth soft surfaces for gripping finely finished work. Plastic caps are recommended for soft metal surfaces.

Nylon Hammer

31 Claimed to have all the advantages of all soft hammers, with none of their disadvantages, a nylon faced hammer has been introduced by *Danielson Mfg. Co.*, Danielson, Conn. Available in 2/3 and 2-lb weights, the hammer is designed for machine shop, repair shop and general use, and it is claimed that it will wear longer, will not chip or mushroom, has no rebound, and is resistant to fire,



oil and chemicals. The nylon faces are replaceable, and when inserted into the head are locked by the patented head construction. They will not heat up or change in shape under continued use, and are said to outperform all other soft hammer materials.

Screw Finder

32 Said to show time savings of 47 pct as contrasted to starting and final setting of screws by hand, a collet type screw finder for electric and pneumatic screw drivers which starts and completely sets screws in a single operation has been announced by James Industries, Inc., 226 Municipal Bldg., Skaneateles, N. Y. The screw finder, which is attached to the screw driver, holds the screw firmly and works in any position and in places not easily accessible. It is nonrotating and close-fitting to prevent the bit from whipping. The bit is guarded and no impression is left on the screw head or on the work surrounding the screw, it is reported. Models are available for all standard types and sizes of machine and wood screws.

Dual Headed Hammers

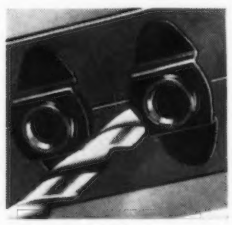
33 Ace 2-1 hammers, designed by *Dan Morey*, 814-16 S. Robertson Blvd., Los Angeles 35, are said to combine necessary weight with perfect balance without bulk or clumsiness. The combination steel and rubber headed hammer affords dual use for both heavy and light work around machine shops, sheet metal shops, and various industries. Rubber and fiber headed hammers are suited to operations in which a solid blow must be struck without injury to working surfaces, such as in aluminum and lighter metal fabrication, light machine assembly work, electrical motor and generator building and repairing. Both rubber and fiber heads are replaceable. The steel and rubber headed model weighs 2½ lb; the fiber and rubber headed Ace 2-1 hammer weighs only 1¼ lb.

Hard Tool Steel

34 Grade K5H, a very hard Kennametal composition, has been developed by *Kennametal Inc.*, Latrobe, Pa., specifically for small tools used in precision boring of steel parts. It has a Ra hardness of 93.2 and great resistance to cratering. Solid tools 3/32 to 5/16 in. diam, and 5/32 to 5/16 in. sq, are available, as well as blanks 3/32 to ⅜ in. diam and 3/16 to ⅜ in. sq, suitable for grinding to any desired tool point shape.

Drill-Jig Bushing

35 Consisting of a formed steel anchor into which is pressed a hardened steel bushing, a drill-jig bushing called Anchor Bushing, has been introduced by the *Hi-*



Shear Rivet Co., 1559 Sepulveda Blvd., Hermosa Beach, Calif. Bushings are supplied in standard drill sizes up to ⅜ in. They can be spot welded to any flat or curved template and do not require heavy fixtures.

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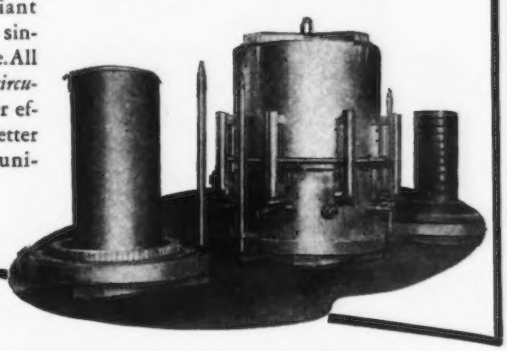

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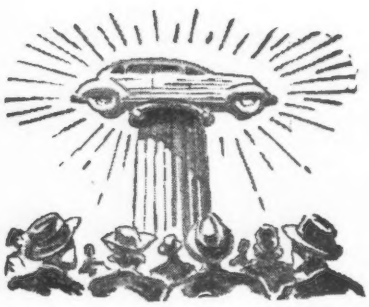
• Ford attempts to find out what employees think about company policies and opens new truck line at Highland Park . . . Edison plans big expansion program.



DETROIT—Results of the first major experiment by Henry Ford II in "human engineering will soon be available.

Whether the company will obtain information that can be used constructively in creating improved management-labor relationships or is merely "sticking its neck out" will be determined within a few weeks when replies to a questionnaire recently sent out by Ford are tabulated and interpreted.

As disclosed in a recent address by John S. Bugas, vice-president and director of labor relations of the Ford Motor Co., on Apr. 24, 1946, Henry Ford II, president of the company, wrote a personal message to 121,000 employees of the company expressing his intention to communicate with them from time to time on matters which he believed were important to them.

The letter merely described certain basic policies of the company and stressed the need for cooperation and team play. No comments were solicited, according to Bugas, but about 350 employees wrote to Mr. Ford as a result of the letter.

About 90 pct of the replies were favorable, Mr. Bugas said, and those that were critical commented on working conditions, lack of cooperation on the part of supervisory employees and the fact that Ford employees enjoy no preference in buying a Ford car.

Encouraged by his initial experience, Mr. Ford sent out a second letter on July 1, 1946 in which he commented on the observations of a plant worker who had complained about layoffs, three days' work a week and small take-home pay.

Although no comments were solicited on the second letter about 250 members of the organization wrote to Mr. Ford.

THE third letter in the form of a questionnaire went out on Oct. 21, 1946. In this letter, Mr. Ford said in part:

"I would like to know what you think about many of the specific problems that we all encounter in making automobiles. . . .

"Therefore, I am enclosing a list of six questions, together with an envelope which requires no postage. . . . Please answer exactly the way you feel and please don't sign your name.

"I am particularly anxious to get your individual comments as well as answers to the questions."

While the company did not solicit the approval of union officials in taking this step, Mr. Bugas explained, the union was advised that the questionnaire would be sent to Ford employees. The UAW-CIO took a constructive view, Mr. Bugas said, and urged its members to fill out the questionnaire and express their views fully.

More than 23,000 employees replied and 90 pct considered the questionnaire either extremely useful or of some use.

While a complete report is not as yet available, Mr. Bugas said, replies have been tabulated and an analysis of the comments not called for in the regular questions is now in progress.

"I cite this whole undertaking here," Mr. Bugas added, "simply because I believe it is a step in the direction which all of us in industry should explore—namely an accurate determination of what employees really do think and really do want. We will have the soundest and best results when we get away from mistaken conclusions of both management and labor.

"I say again that it is one function of industrial relations leadership to interpret the working force to management and to know at all times what the employee wants to achieve.

"This cannot be done by taking the opinion of the first taxi driver you meet," Mr. Bugas concluded.

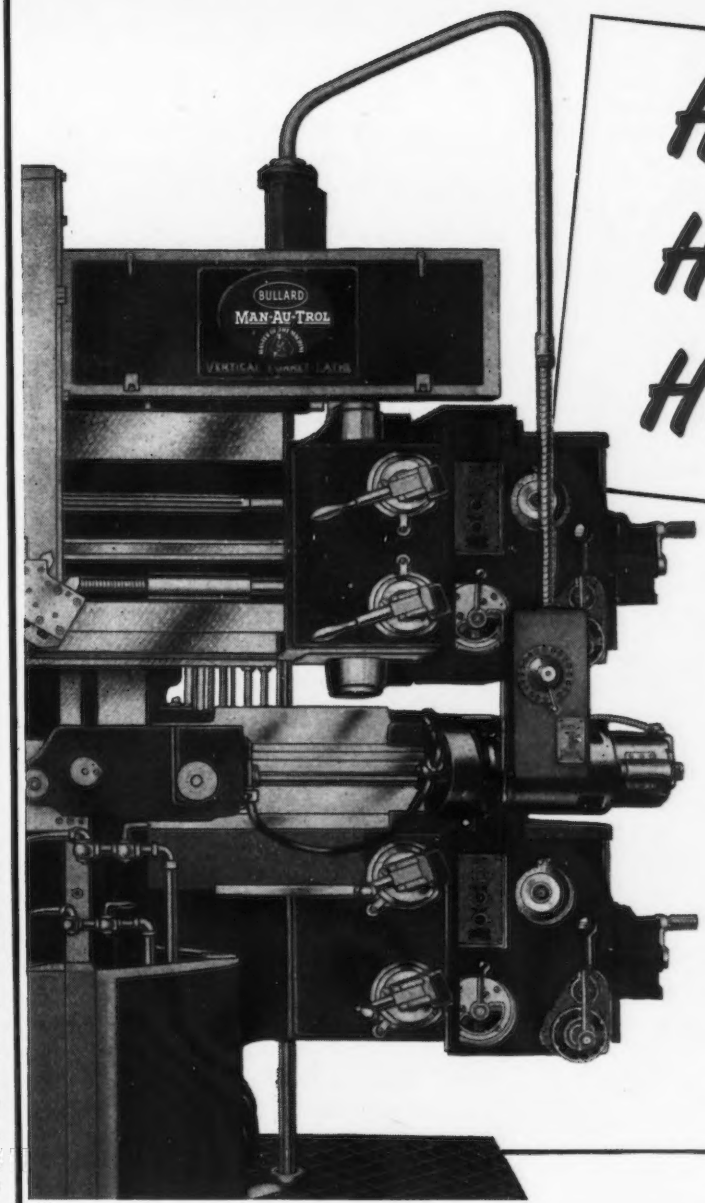
IT is understood that this is only the beginning of the efforts of Henry Ford II to determine first-hand what Ford employees actually think about Ford policies. It is understood that a personal letter from Henry Ford II to Ford employees who sent in questionnaires will be mailed soon thanking them for their cooperation and paving the way for the next mailing which will follow in the near future.

While all personnel managers in the Detroit area do not agree with the methods employed by Ford to determine the wishes of their employees, the Ford experiment in "human engineering" is being watched with keen interest particularly by those who have felt completely cut off from their workers by the Wagner Act.

The Ford human relations program has already produced results. For instance, the company has enjoyed much favorable publicity, particularly by word of mouth. Those who in the beginning may have questioned either the company's sincerity or its ability to do anything about the human relations problem seem now to be quite willing to wait and see what Ford does.

Most observers concede that if Henry Ford II is able to reach sound conclusions about what Ford workers really think—and acts on these conclusions—Ford will be able to capitalize on its findings to a greater extent than any other automobile producer who may come along later with a similar project.

To some people Henry Ford II is taking a big gamble in his human relations program. However, those familiar with his plans consider the project to be more of a calculated risk than a gamble. Right now the chances that Ford will eventually make an important contribution in the field of employee relations seem very good indeed. And even his



How Much? How Many? How Soon?

Three questions that production men must answer *right* the first time

How much it will cost to turn out a product or part depends on *how many* units can be produced *how soon!* To keep getting higher production at lower unit cost you must keep your eyes open for *new methods* to increase output per man-hour with less human effort. The Bullard Company, Bridgeport 2, Connecticut.

BULLARD CREATES ***NEW METHODS*** TO MAKE MACHINES DO MORE

For example: See how the BULLARD MAN-AU-TROL

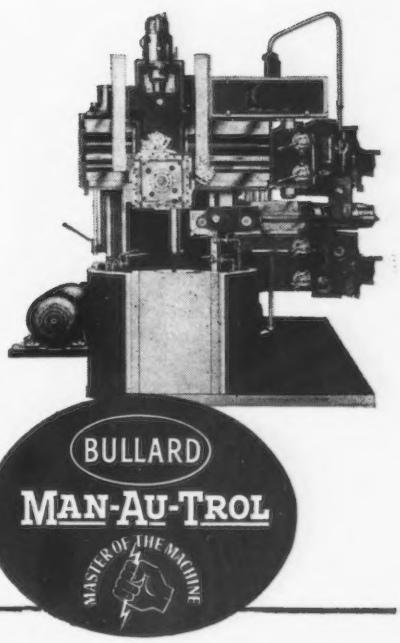
Vertical Turret Lathe lowers unit production costs.

Lightens Labor's Load. Operator machines one piece manually, setting production method into automatic cycle; then merely loads, supervises and unloads while MAN-AU-TROL does the work.

Makes Automaticity Versatile. Automatically handles any work within manually operated scope of Vertical Turret Lathe. Converts instantly to manual operation on same or entirely different piece without affecting automatic cycle.

Saves Set-Up Time. Set-up time from one class of work to another is only slightly more than for a manually operated machine.

Reduces Salvage Cost. Machines day after day with consistent accuracy not obtained under manual operation.



critics agree that no brighter feather could be added to the cap of the new Ford management than a major contribution toward the humanities of mass production, one of the automobile industry's most neglected fields of operation.

FORD'S new $2,100,000 truck line which went into operation this week at the Highland Park plant is said to be the latest, and probably the most modern facility of its kind in the Detroit area. For the past several months Ford personnel has been shifted quietly from the Rouge to Highland Park and the new line went into operation without the loss of a single day's production.

The shift from the Rouge to Highland Park will provide additional space for the production of Ford and Mercury passenger cars and will also enable Ford to expand substantially its present output of trucks.

The Highland Park line is modern in every respect and is 1410 ft long as compared with 800 ft for the old line at the Rouge. At peak production 400 trucks can be built per day at Highland Park compared with the present capacity of 200 units per day at the Rouge.

Currently Ford is assemblying 43 different truck models and the system devised for bringing about simultaneous arrival at the assembly line of the proper truck chassis and its matching body is highly complex and ingenious. In Highland Park this control is accomplished by the use of a central TelAutograph booth providing a constant written record which registers simultaneously on other TelAutograph units located along the line. In all, the new Ford truck line comprises nearly three miles of conveyors with one section devoted exclusively to the automatic sorting of truck bodies which are then moved via various feeder lines to meet the proper truck chassis as it comes down the assembly line. All operations, of course, are electrically controlled.

IN order to provide adequate electric power for the Detroit industrial area, the Detroit Edison Co. will spend approximately $25 million a year for each of the next 4 years.

The program will increase the company's generating capacity from 1,234,000 kw to 1,509,000 kw, according to Prentiss M. Brown, chairman of the board.

The 1947 Edison expenditure will cover the final payment on a 100,000 hp addition to the power plant at Marysville, which is scheduled to go into operation Mar. 1, and the first payment on two 133,000 hp turbo-generators for the Trenton channel plant. The first of these two units, which will be larger than any Edison equipment now in operation, is scheduled for installation in 1949.

DEPENDENT DETROIT: *Giving the lie to the common theory of U. S. self sufficiency is this map showing the extent to which automakers must rely upon foreign sources for vital components. The chart is part of a foreign trade series available through the Div. of Public Liaison of the State Dept.*

CPA Predicts Decline In Machine Tool Sales To $250 Million in '47

Washington

• • • **Manufacturers' sales** of machine tools in 1947 will decline to about $250 million from the estimated $325 million in 1946, according to tentative estimates contained in a CPA report on the machine tool industry. Exports are estimated at about 40 pct of 1947 output.

CPA points out, however, that "production of machine tools in 1947 is difficult to predict because of the violent fluctuations to which the industry is subject. In 1933, for example, sales amounted to only $22 million, while in 1942 they reached a peak of $1.3 billion, 60 times the depression low."

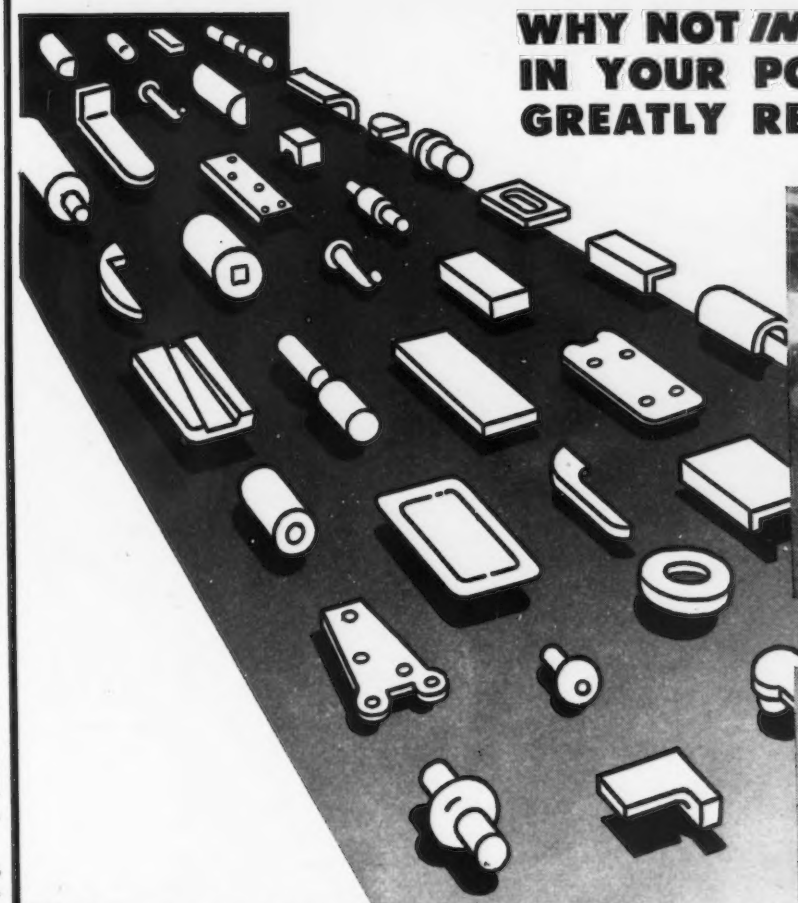
Two major reasons are cited for the expected decline in sales: (1) The competition the industry faces from its own past production, and (2) increased sales of surplus tools at greatly reduced prices.

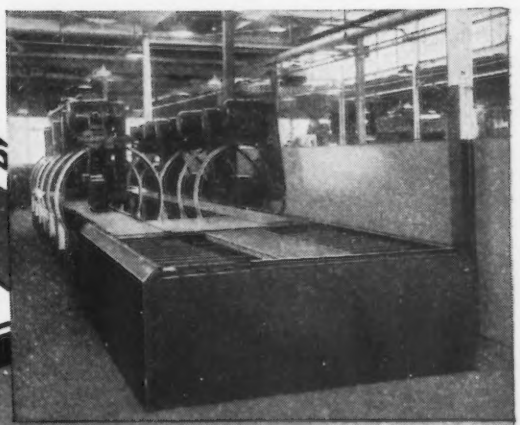
In regard to past production, the report states that approximately 827,000 machine tools were built for domestic use in the 5 years 1941-1945, of which 250,000 were purchased by private users and 577,000 by the government. This figure of 827,000 is over 6 times the 140,000 produced for use in this country during the preceding five year period. The number of machine tools still available from government surplus as of Dec. 1, 1946 is estimated at 300,000, or the equivalent of ten years' production for domestic use at the 1936-1940 average rate and over 1½ yr production at the 1941-1945 rate.

While predicting a level of export sales of about 40 pct of production this year, CPA is quick to emphasize the fact that England is making a strong bid for the foreign market and is quoting delivery dates of 60 to 90 days as compared with United States manufacturers' delivery schedules of from 60 days to 8 months.

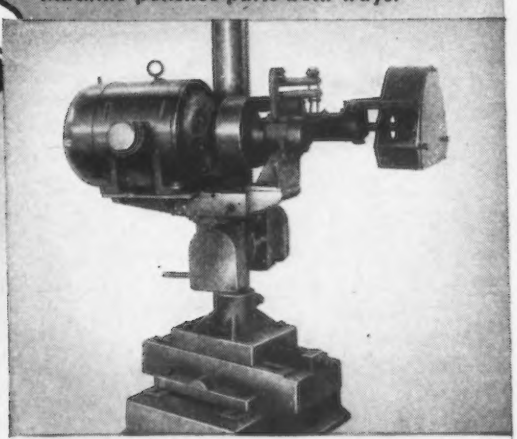
In conclusion, CPA states that with 600,000 machine tools in this country over 15 years of age the industry, by taking advantage of technological changes to improve productive output of machine tools, should be able to meet the competition of secondhand surplus and foreign production, and sustain a fairly good year in 1947.

WHY NOT *INCREASE* PRODUCTION IN YOUR POLISHING ROOM AND GREATLY REDUCE YOUR COSTS?





Udylite Double Conveyor Square Transfer Machine polishes parts both ways.



Pedestal Type Polishing Head which is adjustable in all directions.

Udylite Rotary Polishing Machine equipped with indexing mechanism.

Whether you are polishing auto door handles, watch cases, toaster bodies, or something else a Udylite Polishing Machine with one operator will give you more production in less floor space than a number of lathes each with its own operator.

Not only that but each piece will be polished evenly over all surfaces and every piece will look like every other piece because they are all presented to the wheels in the same manner.

Thus Udylite Polishing Machines permit you to economize on floor space, machinery, machine maintenance and man power—also to do higher quality work with operators who need not be as highly skilled as lathe hands.

A simple investigation will show you how quickly you could amortize an installation in your plant. Why not ask a Udylite engineer to make such an investigation.

2421

THE Udylite CORPORATION

1651 EAST GRAND BOULEVARD

DETROIT 11, MICHIGAN

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Washington . . .

L. W. MOFFETT

• ICC assails Administrative Procedure Act . . . Asks for exemption . . . Says it is confusing and difficult to reconcile with some of Commission's work.

WASHINGTON — The Administrative Procedure Act generally has been accepted by government departments with good grace, or at least they have suppressed public outcries against it. But this is not true with respect to the Interstate Commerce Commission. It dislikes the law, wants to be exempted from it and loudly proclaims the fact in its annual report. Ordinarily a conservative organization that gets on well with Congress, the ICC is the only government bureau to come out boldly and take a crack at the law.

It is quite probable that other agencies have quietly grumbled that it upsets their routine. It of course is meant to do that. Enough of them have not done so, but business interests that have given it any thought see in the act great possibilities of achieving its designated purpose "to improve the administration of justice by prescribing fair administrative procedures." That is to say the new law, enacted by the 79th Congress, not only is intended to eliminate red tape and shortcomings in the government, but it is also intended that business should be given fairer consideration in dealing with the government.

Outstanding among benefits the act will afford to business are those that relate to regulations. Under this law, of which much will be heard as it gets fully under way, government bureaus must, for one thing, give business a 30-day advance notice by publication in the Federal Register of forthcoming regulations. During that period, business may submit comments and recommend changes respecting the proposed new regulations.

The government bureaus are not required to accede to requests for modification of forthcoming regulations but the assumption is that bureaus obviously would make suggested changes where the reason for doing so is soundly and fairly presented. Another requirement of the act is that government bureaus, also through publication in the Federal Register, make clear their rules of procedures so that in any proceeding business will be informed precisely of the practice to be followed in presenting cases before government bodies. The lack of this knowledge in the past has caused untold confusion, waste of time and heavy costs to both the government and business.

BUT the Interstate Commerce Commission declares with considerable force that it has a strong distaste for the new law. It claims that it is partially repetitious of the Commission's present procedure while confusing and difficult to reconcile with some of the Commission's work.

The Commission points out that certain features of the act are deferred. One such feature is the requirement of selection of examiners for agencies for 1 year after approval (or June 11, 1947). Another provision says that "no procedural requirement shall be mandatory as to any agency proceeding initiated prior to the effective date of requirement." These provisions, however, are only palliatives, not cures, for the Commission.

It pointed out that at hearings on various bills it had "urged as strongly as possible that Congress exempt this Commission from the operation of any administrative procedure act."

"We felt and still are of the opinion, that the diversity of functions which the Commission is required to perform is so great that they cannot be grouped into broad categories, and that the procedures for administration of these functions devised by Congress and by the Commission, tested and bettered by years of evolution based on long experience in practical application, would not be improved by passage of any of the bills, but rather would be made uncertain or actually worsened in important respects," said the Commission. "In urging exemption of the Commission, we were strongly supported by the association of our practitioners."

THE Commission complained that it is a matter of great difficulty for it to determine and state in advance, without having the benefit of the opposing views of an able counsel in any controverted cases, and with no judicial interpretation to guide it, just what changes in its organization and procedure will be forced by new acts. It declared that difficulties are apparent in reconciling the provisions of the Interstate Commerce Act and related acts with those of the new act.

Said the Commission:

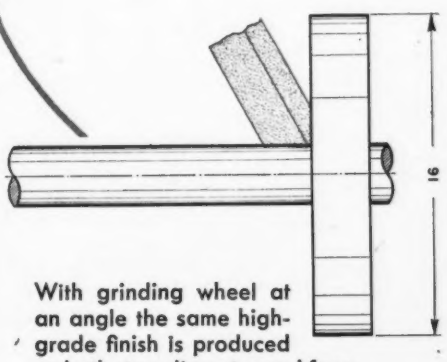
"Thus, sections 7 (as to hearings) and 8 (as to decisions) are with difficulty, if at all, reconcilable with the present provisions of the Interstate Commerce Act contained in section 17, as to the organization of the Commission, and its power to delegate the performance of duties to divisions, individual members, and boards. Again, whether the scope of judicial review has been widened by section 10, and if so, whether unduly, will

In one setting...

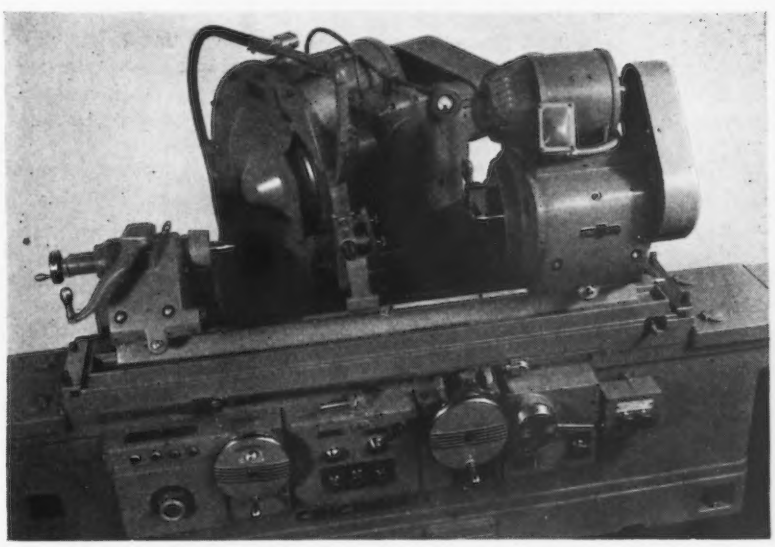
CINCINNATI FILMATIC PLAIN HYDRAULIC

GRINDS FACE OF LARGE DIAMETER FLANGE (up to 16")

AND SMALL DIAMETER BODY



With grinding wheel at an angle the same high-grade finish is produced on both stem diameter and face of the flange at one setting.



The angular wheelhead is mounted on a CINCINNATI FILMATIC 10" Plain Hydraulic Grinding Machine. Notice that the headstock and footstock have been transposed so that the thrust is against the headstock unit.

CINCINNATI

● It's no trick to grind the diameter and the face of an adjoining flange when there's not much difference in size, but when the ratio increases to four or five, then additional problems must be overcome. The machine illustrated here—a semi-standard CINCINNATI FILMATIC Angular Wheelhead Grinder—grinds the body diameter of the part, and at the same setting, the face of an adjoining flange up to 16" diameter. Starting with a stripped down CINCINNATI FILMATIC 10" Plain Hydraulic Grinder, Cincinnati Application Engineers added the following units: right-hand headstock raised to swing 16" diameter; left-hand raised footstock with latch type retraction of center; 30° angular wheelhead raised to grind 16" diameter work; 5" hydraulic cross traverse at a grinding rate. The machine handled the job perfectly, accurately sizing the stem diameter while producing a high-grade finish on the face of the flange at the same setting. ¶ Perhaps you could use this type of equipment to advantage for some of your cylindrical grinding operations. Why not talk it over with our Application Engineers?

CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTER TYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

be for the Federal courts, and ultimately for the Supreme Court to determine. Finality in interpretation of these and many other questions may come only after cases involving them have gone through the courts. Meantime, uncertainty will exist."

It was emphasized that provisions of section 11, as to examiners, will considerably affect the Commission's personnel and the conduct of its proceedings. It was pointed out that for 30 years examiners have been appointed through the processes of civil service, as contemplated by the new act, but that their services could be used flexibly, as required.

THEIR compensation, it was stated, has been fixed by the Commission within the limits of the Classification Act, and reflects their capabilities and the duties assigned to them, subject to the approvals and reviews afforded by law. The Administrative Procedure Act requires that they "shall be assigned to cases in rotation so far as practicable and shall perform no duties inconsistent with their duties and responsibilities as examiners." Their compensation will now be prescribed by the Civil Service Commission independently of ICC ratings or recommendations.

While it says it cannot state what reorganization of the largely functionally specialized staff of examiners of the Commission will be required, the Commission said that it appears that an increase in the number and in travel expense will be inevitable. What changes in compensation may result, the report says, will be determined by the Civil Service Commission, "and we can only speculate as to the ultimate effect upon our personnel and its morale."

"We have not been able to find and no one has pointed out any provision in which it (the new act) will simplify or facilitate our work," the Commission declared.

The ICC winds up on the unhappy chord that it must apply the act in letter and spirit, "so far as ascertainable," adding that it does not contemplate any radical changes in its organization or procedural methods until inconsistency with the new act is clearly shown."

DISCUSSING spotting service at industrial plants, the ICC said that it is its purpose to determine as soon as practicable how and to what extent the carriers are applying a terminal tariff covering operations north of the Potomac and Ohio Rivers and east of the Mississippi River. The tariff embraces rules which they believed would achieve uniform application announced by the Commission in "Propriety of Operating Practices —Terminal Services." The Commission said that, where deemed advisable, it will institute proceedings to determine the lawfulness of the railroads practices.

There was considerable difference of opinion among the shippers and some of the carriers whether the tariff modified or changed the principles set forth in that report. In its decision of July 1, 1946, in the Corn Products Refining Co. case, the Commission found that the rules and regulations in the tariff were intended to be, and are, in full accord with those principles and interpreted some other provisions of the tariff.

The report said that owing to the falling off in traffic at numerous plants and to interruptions of operations due to shortages of materials and other causes, the amount and character of terminal services rendered and required at those plants have been very unstable. It was stated that this was illustrated by one instance where tariffs were filed proposing to pay allowances to a new industry for performing its own switching.

The schedules were suspended and ICC employees inspected the plant, observed the services for which it was proposed to pay allowances, held a hearing and a proposed report was served, but before the proceeding was submitted for final action, it was reopened on petitions filed by all parties because the conditions had radically changed. A further hearing was held and the matter is now pending.

Similar developments in other proceedings exist. In view of these circumstances and conditions the Commission has not instituted any new investigations on its own motion since Jan. 1, 1946, except in cases where tariffs have been filed proposing allowances to new industries. No complaints, the report said, have been filed about terminal services. Five final reports have been adopted in various proceedings regarding terminal services.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

HE'S HOW YOU GET AN INFERIORITY COMPLEX -- HE RUNS A DINKY LITTLE LATHE AN' HE GIVES THE IMPRESSION THAT IT TAKES A LOT OF STUFF TO TURN IT!
WELL, IF HE LEFT TH' TOOLS LAY ON TH' MACHINE IT WOULD LOOK LIKE A LOT BIGGER MACHINE!
T. M. REG. U. S. PAT. OFF.
THE GOSSIP CORNER
2-7
J.R.WILLIAMS
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Compare THE LOW PRICE OF CARBOLOY STANDARDS WITH ORDINARY TOOLS!

Surprising, but true!—the price of Standard Carboloy Tools is actually lower than steel tools in sizes ¾" sq. and larger, and but a few cents more in smaller sizes. Check these typical prices of a Style T-4 Turning Tool against your ordinary tool cost: 5/16" sq.—84c, ⅜" sq.—90c, 7/16" sq.—$1.32.

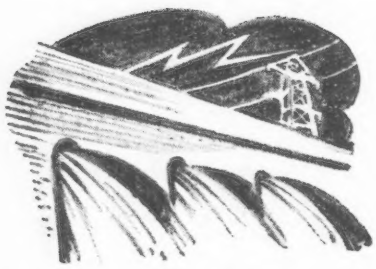
Yet—bear in mind, at prices this low—*you get a whale of an improvement in performance!*

Investigate Standard Carboloy Tools for *your* plant. Write for Catalog GT-175R. Carboloy Company, Inc., 11153 E. 8 Mile Ave., Detroit 32, Michigan.

West Coast . . .

ROBERT T. REINHARDT

• West Coast basing point price situation still beclouded . . . Los Angeles engine plant starts production.



SAN FRANCISCO—West Coast steel prices, which have been floundering around like a ship without a rudder since abandonment of Pacific Coast basing points last month, may have an anchor to windward in the basing point prices announced or expected to be announced by major West Coast producers.

The independent producers which turn out only merchant bars and some reinforcing bars still cling to their f.o.b. mill price with assurance that so long as the heavy demand exists they will have plenty of buyers close to home. Henry J. Kaiser Co., Inc., is delivering plates, structurals and merchant bars to Pacific Coast points at base prices which in the case of merchant bars is higher than Bethlehem Pacific Coast Steel Corp.'s price, although the differential is slight when switching charges are added to Bethlehem's price of $3.285. Kaiser's price is $3.56 cwt including switching.

The general trend was upward on the newly established prices as was expected because of increased costs of scrap and labor and the necessity for making adjustments in those items which were sold at a loss under OPA lists.

IT is too early to report complete consumer reaction, but in general it is believed there will be no opposition to the new scale and there is the feeling that perhaps now it will be safe to bid on jobs which have been too hot to handle on long term commitments. Stabilization of price apparently is now just as important as the dollars and cents involved.

One producer, in the business for more than 20 years said, "This price situation has been the worst I've ever seen." Not only are current production costs causing headaches, but the uncertainty of labor's attitude and potential demands are imponderables.

Bethlehem's policy of selling its West Coast products on a "delivered at Pacific Coast destination" with the exception of merchant and reinforcing bars, has its customers wondering a bit while these prices are being computed. Whether the price of the structurals made in Seattle can compete with that of Kaiser's made in Fontana, Calif., when delivered in Los Angeles or San Francisco is only one question floating around.

As an indication of the demand for structurals in this section, it is interesting to note that Bethlehem Pacific's fabricated steel construction division now has 12,000 tons of orders ahead which is about equal to 6 month's capacity of its Alameda, Calif., works. Strangely enough, the bottleneck in production there is not a shortage of material, but the lack of trained draftsmen. Steel inventories are now, however, only about half of a normal 8000 ton stock.

LOS ANGELES—Production of gasoline engines is now under way at McCulloch Motors Corp. new $1,600,000 plant. Scheduled production for the month of January 1947 was 4300 engines, with increases planned during successive months until the capacity of 60 engines an hr is reached. At that time, employment is expected to be about 1000 workers.

The company, headed by Robert P. McCulloch, president, recently moved its entire operation from Milwaukee to Los Angeles. Area of the new plant is 75,000 sq ft, although plans call for expansion to 200,000 sq ft.

First engines to be produced in volume will be a series of 2-cycle, air-cooled models ranging from 2½ to 4 hp. Three of this first series are engines adaptable to a variety of applications in the industrial, marine, aircraft, transportation and other fields. All major parts are of high-pressure, aluminum alloy die-castings, with the exception of rods, crankshafts and cylinder sleeves. The engines are light weight; one model, for example, weighs 24 lb for 4 hp at 4000 rpm rated speed.

Also in production, but in lesser quantities, is an opposed-type 2-cycle engine designed to develop extremely high horsepower (per lb) for use in target aircraft.

Gasoline-powered scooters are scheduled for production beginning in March 1947. Provided with a 4 hp, 24-lb engine, the scooter will weigh only 75 lb complete. Standard equipment will include a foot starter, automatic clutch, throttle and brake controls.

Concurrently, a program of development and experimentation on other types of engines up to 125 hp is being carried on.

PRODUCTION goal of Studebaker Pacific Corp. has been placed at 20,000 units for the year beginning Mar. 1, 1947, according to Stanley Whitworth, vice-president. Reconversion from wartime aircraft work has been completed and the Vernon plant, in the Los Angeles industrial area, is now assembling model 6G Champions. Assembly of 14A Commander passenger cars is to start in the immediate future.

Fabrication of all sheet metal assemblies, including bodies, hoods and fenders, from rough stampings, is planned at the California unit as soon as equipment can be obtained. New installations already in use at the plant include sheet metal enamel spray booth systems for body and other sheet metal parts, with improved controlled purified and humidified air. Paint ovens are using humidified air for obtaining increased luster. Another new operation is frame drilling for body bolts, radiator and front suspension attachments.

Studebaker's general policy is to obtain as much material as possible from the West Coast, taking into consideration competitive prices and costs of any special tooling. Although sub-assemblies and parts for the California unit come largely from the parent corporation's plants or by direct shipment from eastern parts suppliers, a variety of items is purchased here. The

BLISS AGAIN MAKES TOGGLE PRESS NEWS

New Single-Crank Line in 8 sizes offers many design and operational advances

Always the pioneer in advanced toggle press engineering, Bliss now presents a new single-crank line, designed for increased drawing production and efficiency. If you draw cooking utensils, hollow ware and shells of any type, deep or shallow, from steel, brass copper, aluminum or other metals, these 1947 presses will prove profitable additions to your stamping equipment.

The new line comprises eight sizes of presses, ranging in shaft diameter from 4¼" to 7" and in length of stroke from 8½" to 24½". Die-space dimensions and operating speeds remain the same as those for corresponding models in the previous line (Nos. 1½ to 4A) thus permitting interchange of tooling.

Analyze the improved factors in the adjoining check-list of new features, incorporated only after thorough engineering research and testing. And then ask a Bliss Sales Engineer to provide complete details. He'll be glad to show you how to apply these new presses to your individual production problem.

FEATURES OF NEW BLISS TOGGLE PRESS

1. **Frames are one-piece stress relieved steel weldments...** resulting in weight-savings, and reduced floor space requirements.
2. **New toggle drive** provides crosshead with long gibways at position most needed...reduces bearing overhang... renders greater accessibility.
3. **New Bliss Single Disc Pneumatic Friction Clutch,** with one-station electric pushbutton control...air brake for stopping flywheel.
4. **Direct-connected liftout in bed.** Liftout rods are outside specified bed area, leaving space between uprights free and clear...handwheel adjustment on center liftout rod.
5. **Steel rockshafts,** yokes and links in blankholder mechanism.
6. **Steel gearing throughout.**
7. **Crankshaft, rockshafts, intermediate shaft** and link pin bearings are bronze bushed...roller bearings on driveshaft and flywheel.
8. **Bliss Manifold Lubrication System,** with metal tubing leading to each bearing.

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN

Mechanical and Hydraulic Presses, Rolling Mills, Can and Container Machinery

WORKS AT: Brooklyn, N. Y.; Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Derby, England; St. Ouen sur Seine, France • SALES OFFICES: Detroit; Brooklyn; Cleveland, Dayton, Toledo, Ohio; Lansing, Mich.; Chicago; Philadelphia; Rochester; New Haven; Boston; Toronto.

STAY AHEAD WITH *Bliss*

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

list of parts and equipment purchased on the Pacific Coast, when obtainable, includes chassis springs, standard connecting parts, greases, lubricants, enamel, all interior trim, batteries, tires, seat cushion and seat back springs.

SALT LAKE CITY—Utahns are anxiously awaiting the deadline for filing of petitions to suspend the recently announced reduced rates on finished steel from Geneva, Utah, to Pacific Coast points. They are hoping that no effort will be made to prevent the rates from becoming effective on Mar. 1. But if a suspension petition is filed a campaign reminiscent of the one preceding transfer of the Geneva plant to U. S. Steel Corp. will get under way. The state, chambers of commerce and miscellaneous organizations are prepared to wage a fight for the reductions and will expect strong support from steel consumers on the Pacific Coast.

The Geneva plant is currently in the throes of a bargaining election campaign preparatory to the third test between the AFL and CIO United Steelworkers of America Feb. 12 and 13. The CIO can be expected to make an all-out effort to oust the AFL from its isolated island in the basic steel industry this time, and the AFL, in the opinion of some outside observers, is being weakened by craft rivalries which have been remarkably well suppressed at the plant but not killed. The AFL has been operating as an industrial unit since it won the bargaining rights at the plant in 1944.

Urges U. S. Firms To Allocate Some Output To Foreign Markets

Chicago

• • • **Speaking before** the Federated Advertising Club of Chicago, R. W. Gifford, chairman of the board of Borg-Warner International Corp., said that American firms must allocate a definite share of their production to the foreign market even before domestic needs are filled or someone else will have the business. Mr. Gifford, who is also vice-president of Borg-Warner's Norge Div., pointed out that the pent-up demand in the world for our merchandise is beyond belief and he predicted that America ultimately will reach an export volume of more than $14 billion annually.

"American advertising know-how can help to bring about mass consumption of American goods abroad as it has at home," the speaker told the members of the club. He urged advertisers to make careful analyses of the foreign markets for their products and to study the psychology of their consumers overseas.

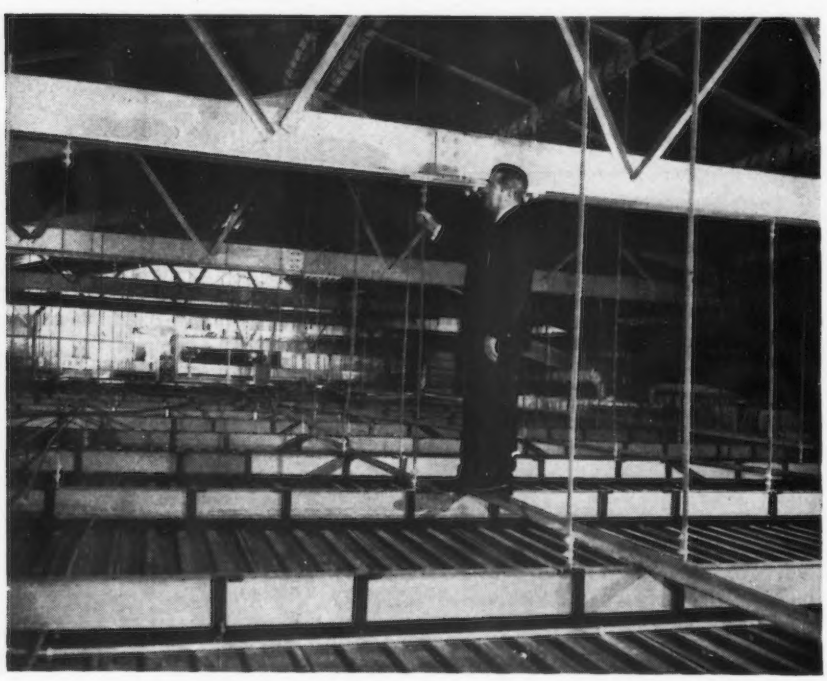
The extent of our foreign trade may determine whether or not the country prospers, Mr. Gifford said, "because in our nation's business, just as in private business, it is generally the last 10 or 15 pct that determines the profit or loss. Those who were doing business abroad before the war have just as definite an obligation to their foreign distributors as they have to their domestic distributors. Those who wish to develop those foreign markets for the first time cannot afford to wait until the domestic market is supplied."

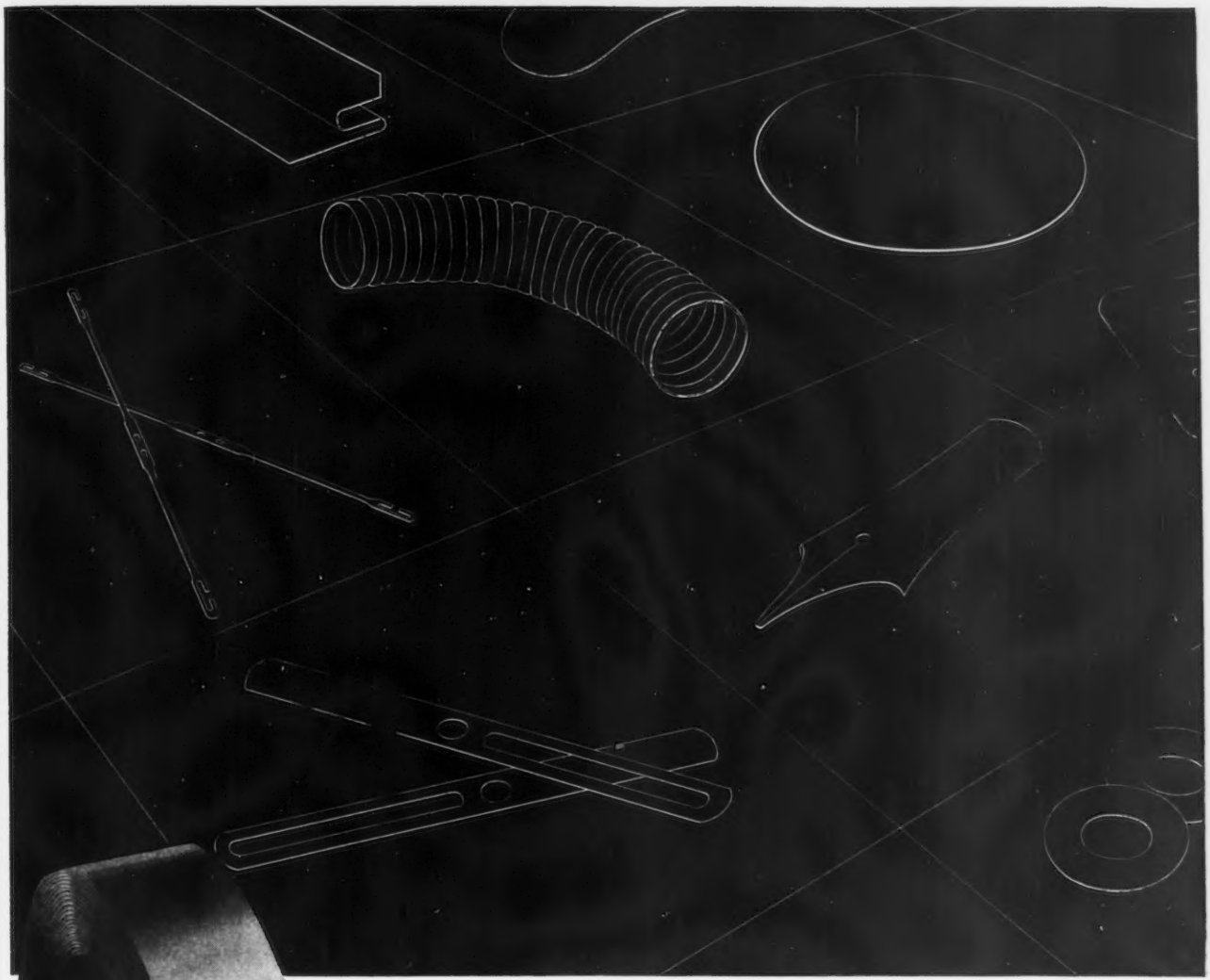
The speaker pointed out that other countries with lower wages are improving their relative industrial efficiency and they will, therefore, become more difficult competition. Mr. Gifford found the foreign trade picture shadowed by international bickering.

While "every country in the world is crying for merchandise and raw materials of every kind," the speaker told the group, "the world is engaged in the greatest political fight it has ever seen." He observed that "England is fighting desparately to uphold the world trade influence of the British Empire, while we argue with the Russians." He informed the group that England is withholding all luxuries from her own people in order to regain her trading position abroad through export.

"England is doing a good job," Mr. Gifford said, "and she has no intention of making concessions that will be to our special benefit. She is now making trade agreements in all parts of the world while we talk about what we hope to do. Other countries also are striving for a place in the foreign trade sun." Mr. Gifford implied that he does not look for Russia itself to be a serious commercial threat outside her own trade sphere for many years.

NOT PART OF THE SHOW: *What the audience in the new prefabricated Crest theater in Long Beach never sees is this bat's eye view of the ceiling. R. H. McCullough, its designer, inspects some of the load carrying members of the theater roof and ceiling. The latter is assembled from* 18-*gage fluted material with a baked enamel finish.*





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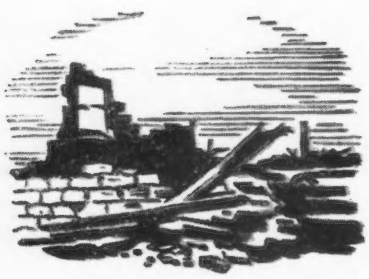
THE AMERICAN ROLLING MILL COMPANY

European Letter . . . JACK R. HIGHT

• Russians finally prepared to increase limit on German steel ingot capacity . . . British Iron & Steel Federation passing buck for English steel shortage to U. S.



LONDON—The "Master Plan" that was so painstakingly worked out by the four occupying powers for Germany which established the future level of German industry at approximately 1932 standards is about to go by default, particularly in reference to the limitations it placed on the future of the steel industry. As far as the American Military Government staff is concerned, there will certainly be some tears shed, as this was the only Four-Power agreement of first importance ever achieved by the Allied Control Council in Berlin.

Months of work at the end of 1945 and beginning of 1946 went into the level of industry plan, and the final agreement on a press statement alone took almost a week of sweaty negotiations. Except for the embarrassment that the Russians may be able to cause in German politics, British occupation authorities have more cause to be happy as the 7.2 million metric ton annual limit for steel production is increased. Even at the time the plan was announced, British officials made no secret of their conviction that the ceiling was absurdly low, and could promote only more trouble and an economic hazard in Western Europe (see THE IRON AGE, April 25, 1946, p. 108).

The British officials have become more convinced as months went by that their views were correct. The ever dimmer prospect of an economically unified Germany, leading to the unification of the British and American zones as of 1947, has finally convinced American officials that the whole level of industrial activity in the two zones must be on a much higher scale if Germany is to be able to pay its way.

BUT, ironically, the Russians who lobbied in the earlier negotiations for a level nearer 2 to 3 million are now making the first direct passes at breaking up the level of industry regimen. Where in the early postwar period the Russians and the French favored very low figures, the British preferred a production limit of 11 million to 12 million metric tons per year, and the American Military Government was instrumental in engineering a compromise settlement.

Now the Russian Government, unable to get the reparation deliveries from the British zone in the form of rolling mills and other equipment, is ready to take the next best possibility in the form of reparations of actual steel shipments, or "out of current production," as the State Dept. puts it.

The Soviet policy in any such matter that may be construed by the Germans to be to their advantage is to announce it through the Berlin leaders of the Communist Party in Germany which the Russians are sponsoring. Thus, the Four-Power Allied Control Commission has received no official notification of the fact that the Russians are now prepared to accept the expansion of German steel output in the British zone, although the Germans have been so informed through the leaders of their Communist Party.

The private decision of the British Military Government to avoid stripping the potential of the Ruhr by precipitate shipments which I mentioned some weeks ago was in anticipation of the present determination to put the Anglo-American joint zone on a pay-as-you-go basis. I think it would not be too far wrong to say that the first major policy for British occupation is that the $320 million that England paid last year to support the Germans must be eliminated.

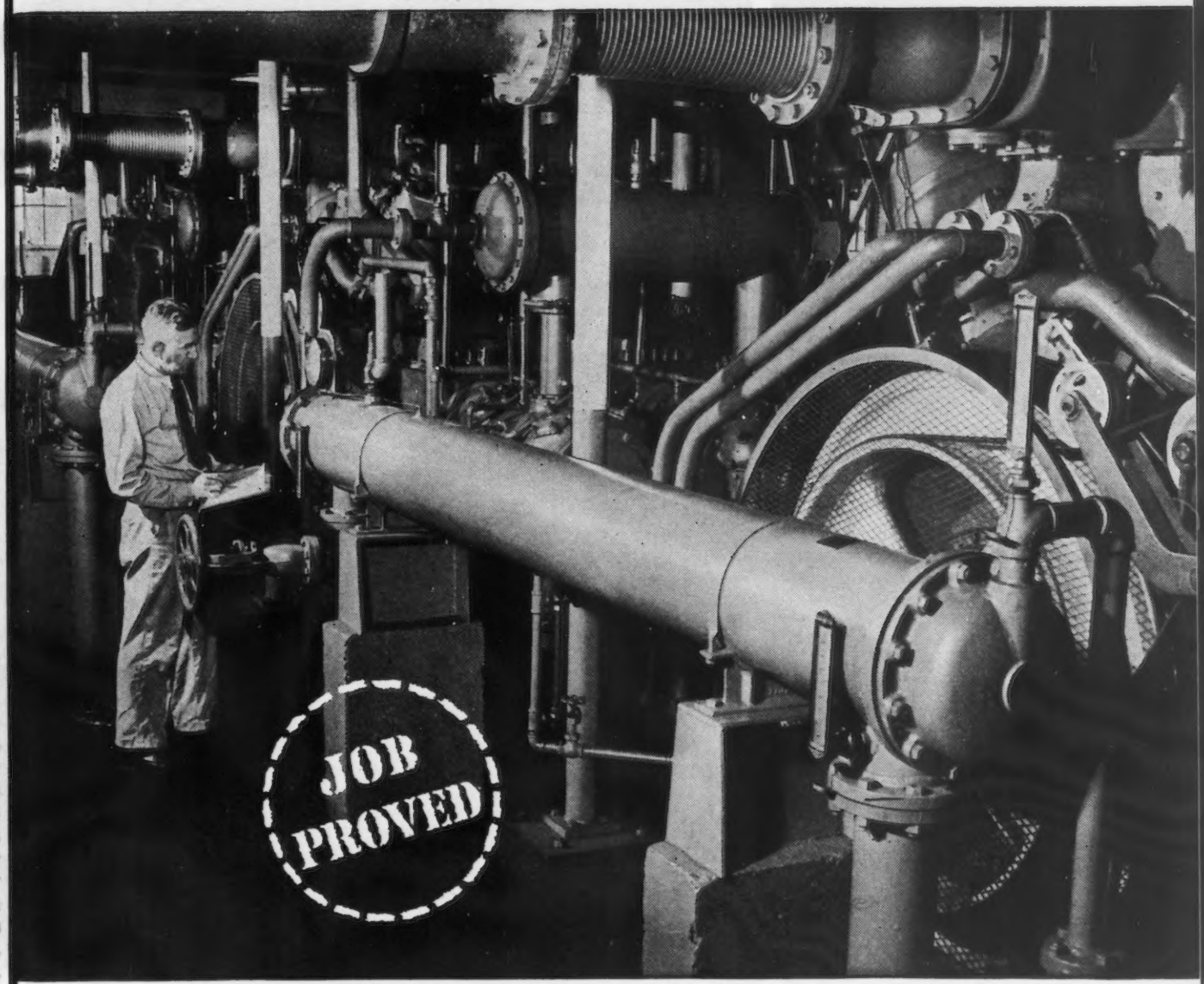
JUST how far this effort to put Germany on a paying basis may go in the face of unalterable French opposition cannot be determined. Many Frenchmen already suspect England of desiring to build up Germany at the possible expense of France. In addition, the French officials have an idea that a good way to put a rigid control on German warmaking of the future would be to arrange for French blast furnaces to furnish major portions of the pig iron needed by German steel furnaces. The system, if it is to be seriously considered, has some obvious merits from the French point of view.

The original necessity for France to assure an external market utilizing its surplus iron ore or product therefrom always crops up in any such negotiations. This factor becomes important again in the current battle which is raging quietly on an international level to determine the wisdom of the maximum use of indigenous iron ores in the Germany industry. For those men who are painstakingly working out a balance of German exports and imports, the advantages of using domestic ores are obvious.

On the other hand, Norway, Sweden and France, among other countries, have pressing problems of disposing of iron ore surpluses, and each would consider such action a mortal blow aimed directly at their economic downfall. Of considerably less importance in the international political sphere, but no less vocal, are the assurances of the German industry itself that some rich imported ores must be added to the burden for effective economic operation.

FOLLOWING a lead established by the British Iron & Steel Federation, I think I detect a growing feeling in industrial circles in the United Kingdom that the United States is largely responsible for the increasingly serious steel

Compressing Maintenance Problems



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shortage which is harassing the reconversion efforts of many British consumers. Whether deliberately achieved or not, this idea has been propagated to the extent that the British Government is now offering the same excuse to would-be steel consumers.

In a speech to a technical group interested in railway right of way maintenance, G. R. Strauss, Member of Parliament and assistant to the Minister of Transport, explained that "owing to the exceptionally heavy demands for steel for home and export use and the lack of imports from the United States, it has been estimated that there will be an overall shortage of supplies compared to demands amounting to half a million tons in the first quarter of 1947 alone. It is therefore evident that it will be impossible this year to meet the steel needs . . ."

This statement is quite accurate so far as it goes, but it would be almost equally easy to have inserted in the place of the United States any one of ten or twelve other countries, but it is becoming a habit and custom in this country whenever the shortage of steel is mentioned to say first that it is due to heavy demand and second that the United States has defaulted in its obvious duty.

It might be historically more accurate if the federation had stated last autumn that it was anxious to import 2 million tons of steel from the United States during 1947 "primarily because the United States was the only country where there was a hope of getting the required amount of steel at the price Britain wanted to pay."

IN prewar years the British Iron & Steel Federation fostered a system whereby substantial tonnages of semifinished steel were imported primarily from Belgium, Luxemburg and France to be rolled into finished products in British mills. Now the federation in drawing up a modernization plan for the future of the British industry proposes that exactly the same situation shall prevail. Although not specifically stated, it is commonly expected here that imports will come from the same countries, as they are expected to be low cost producers.

Unfortunately, however, for a number of reasons, some good and some bad, Belgian and Luxemburg producers are currently selling at very high prices. The maintenance of price control in America until the end of 1946 kept American steel prices far below the range which the Continental producers were demanding.

One important reason for the high level of European prices, excluding the British, has been that most mills have been operating at 40-50-60 pct of their relative capacity, and have in nearly every case been compelled by social legislation or dictates of conscience to maintain their payrolls and bear extremely high overhead costs. In turn the fundamental reason that these countries have been operating at such low rates has been that British Military Government officials in Germany have withheld the exports of coke and coking fines from the Ruhr upon which those countries depend.

WHEN high Continental prices are cursed, as they are frequently in British steel circles, little consideration is paid to the undoubtedly difficult financial position which these firms find themselves in as the accumulative result of German occupation and extremely reduced outputs since liberation.

There was some obvious disappointment locally as the British steel shortage, which developed more slowly than the one in America, sent a British Iron & Steel Federation buyer off to America and subsequently sent Sir Andrew Duncan in his wake. The sad failure of their joint mission has been generally accepted here, although there has been no public pronouncement on the subject.

The timing of the effort contributed to giving the overall impression that the United States should be exporting more steel, as Robert Shone, secretary of the federation, in public here on a railway freight rate case, in an obvious effort to make the effect of a rate increase sound as tragic as possible, stated that 2 million tons of imports were expected from the United States. The newspapers immediately accepted this statement as possible relief from the steel shortage which was just at that time beginning to make itself known to the daily press.

Completion of 300,000 Homes in 1947 Set By British White Paper

London

• • • Great Britain's housing program for 1947 has been set out in a recently published White Paper. The main objective is the completion of 300,000 houses, 240,000 of which will be permanent and 60,000 temporary. In addition the program provides for 200,000 permanent houses under construction at the end of the year and a further 100,000 in contract. In 1946, 58,211 permanent and 92,426 temporary houses were completed in Great Britain.

The 1947 program for permanent housing will it is understood be divided as follows: Local authorities, 190,000; private builders, 35,000; war-destroyed houses rebuilt by local authorities or private builders, 15,000.

The White Paper states that the program is based on specified assumptions as to the supply of labor, materials and components, which can be tested only by the course of events. In particular, the rate of building will be reduced if it proves impracticable to obtain increased imports of soft-wood timber, but it is not proposed at present to limit the program because of this uncertainty, and maximum efforts will be made to obtain supplies.

Of the present labor force available to building and engineering, which is about 1 million strong, approximately 60 pct, or 600,000, will again be devoted to rehousing. The White Paper estimates that 320,000 of this force will work on permanent houses and 280,000 on maintenance, repair, conversion, adaptation and war-damage repair.

Britain's housing program, according to sources here, has no axe to grind for any particular material or method. Good progress is reported in the manufacture of aluminum prefabricated houses by several of the aircraft companies. Simplified concrete pouring methods and the use of precast slabs of concrete and similar material are also proving helpful. Steel is also being employed but its short supply has forced a reduction in some of last year's ambitious plans.

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The Houghton Man who calls on you has one of these kits. He is ready to show the results of our re-evaluation which reduced the varieties of Cosmoline to a needed nine that solve all plant metal corrosion problems. Ask him to show you these products; including four removable solvent-type films, one which is "non-removable" and dielectric, and four oil-type grades of varying viscosities from light to extra heavy. Houghton takes pride in this peace-time line-up—a brand new series with a grand old name—COSMOLINE—made since 1881 by E. F. Houghton & Co., Philadelphia 33, Pa.

ASK THE HOUGHTON MAN TO SHOW YOU THE "WINNING NINE"

PERSONALS

o o o

• **D. M. Morewood** has been named assistant vice-president, traffic department of U. S. Steel Corp. of Delaware, Pittsburgh. Mr. Morewood, who has been employed by the corporation and its subsidiary companies since 1914, joined the U. S. Steel Corp. of Delaware as an assistant to Mr. Plowman early in 1944. Prior to that time he had been assistant traffic manager for Carnegie-Illinois Steel Corp. and other U. S. Steel subsidiaries in the eastern district.

• **James M. Darbaker** has been appointed manager of Chicago district operations of Carnegie-Illinois Steel Corp. to succeed **Walter E. Hadley,** who is retiring after having been associated with U. S. Steel since 1904. Mr. Darbaker has been assistant district manager at Chicago since 1943.

• **Jay J. Martin** has recently been appointed works manager of the Pueblo plant of Colorado Fuel & Iron Corp., Denver. He began his work with CF&I in 1926 at Pueblo as assistant openhearth superintendent and was made superintendent in 1937. **Rudolph Smith** has been named superintendent of the openhearth department and **W. B. Jacobsen** has been appointed superintendent of rolling mills and finishing department. Mr. Jacobsen has been with CF&I since 1940. **William Meredith** has been appointed superintendent of Pueblo wire mill. He came to CF&I in 1902, left in 1903 to work for the Morgan Construction Co., but returned to the Pueblo plant in 1904 as master mechanic of the wire mill. In 1920 he was appointed assistant superintendent.

• **John Cannon** has been appointed mechanical superintendent of the Pullman-Standard Car Mfg. Co., Chicago. He will direct the activities of the six large shops in Chicago, St. Louis, Buffalo, Atlanta, Wilmington, Del., and Richmond, Calif. Mr. Cannon joined Pullman in 1913 and in 1942 was transferred from Wilmington to the company's headquarters in Chicago as junior assistant mechanical superintendent. **L. F. Munson** has been appointed assistant mechanical superintendent of the same organization. Mr. Munson joined Pullman in 1911, later becoming manager of the Atlanta shop.

• **James Fleming** has retired as assistant comptroller, U. S. Steel Corp., New York. He is succeeded by **Robert C. Tyson,** general accountant. Mr. Fleming has served U. S. Steel and its predecessor for 48 years and has been assistant comptroller for the past 30 years. Mr. Tyson joined U. S. Steel in 1939 as assistant audit supervisor. He became general accountant in 1942.

• **Bernard A. Johnson** has been made assistant general manager of the Johnson Steel & Wire Co., Worcester, Mass.

• **Stephen S. Conway** has been appointed vice-president in the sales department of the Brake Shoe & Castings Div., American Brake Shoe Co., New York. Mr. Conway, who was formerly assistant vice-president in sales, has been with Brake Shoe since 1912, and with the sales department of the Brake Shoe & Castings Div. since 1929. In his new position, he will continue to be located in Chicago. **Ralph L. Robinson,** district sales manager of the Brake Shoe & Castings Div., will be made assistant vice-president in the sales department. Mr. Robinson has been associated with Brake Shoe in a sales capacity since 1928.

STEPHEN S. CONWAY, vice-president, sales department, Brake Shoe & Castings Div., American Brake Shoe Co.

• **W. O. McMahon,** for 14 years associated with Sloss-Sheffield Steel & Iron Co., Birmingham, as sales and service engineer and for the past year as consulting metallurgist, has resigned to devote all his time to foundry consulting work.

• **F. J. Bogard,** formerly sales agent at the American Car & Foundry Co.'s Huntington, W. Va. office of the mine car sale division, has been assigned new free lance sales duties in which he will cover the entire bituminous coal region. **C. V. Murphy** has been appointed sales agent succeeding Mr. Bogard. Mr. Murphy has spent the past 4 years in the ACF manufacturing and time study departments.

• **M. F. Cotes** has been appointed executive vice-president of Motor Wheel Corp., Lansing, Mich. Mr. Cotes' association with Motor Wheel dates back to 1932 when he came to Lansing to become sales manager of the company's Duo-Therm Div. Elected to the directorate in 1937, Mr. Cotes has served as vice-president in charge of the Duo-Therm Div. since then.

• **K. W. Warren** has been appointed sales manager and **Thomas J. Marshall,** assistant sales manager, of Federal-Mogul Corp., Detroit. Mr. Warren joined Federal-Mogul as sales engineer in the Chicago territory in 1936, and became assistant sales manager at Detroit in 1939. Mr. Marshall joined Federal-Mogul in 1930 in a sales and advertising capacity. He continues to direct the company's advertising.

• **Vincent Manka** has been elected vice-president of Claud S. Gordon Co., Chicago. For the past 3 years Mr. Manka has served the company as general sales manager.

• **J. C. Springer,** former manager of the credit and collection department of Cutler-Hammer, Inc., Milwaukee, has been elected treasurer to succeed **H. F. Vogt,** who resigned recently but who will continue as chairman of the executive committee. **Rex Davies** becomes head of the credits and collection division. **J. C. Borden,** manager of the contract termination division for several years, has been appointed comptroller. **B. M. Horter** has been made director of purchases for all the company's plants.

• **B. J. McLaughlin** has been appointed district sales manager for the Philadelphia territory of Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa. He will make his headquarters in Philadelphia. Since joining the company in September 1946, Mr. McLaughlin has been located at the factory at York.

• **Dr. G. M. Butler,** who has been associate director of research in charge of tool and die steel and allied products for Allegheny Ludlum Steel Corp. as well as chief metallurgist at its Dunkirk, N. Y. plant, will devote his time exclusively to duties as associate director of research. **J. A. DeFries** has been appointed chief plant metallurgist at Dunkirk to assume the duties vacated by Dr. Butler.

• **Rex Wilson,** formerly in the Detroit office of Monarch Machine Tool Co., Sidney, Ohio, has been transferred to the Pittsburgh office of the company. **N. L. Dilworth,** who has been in the home office, will become a field sales engineer for the company with headquarters in Toledo. **Sam Dansker** has been appointed export sales manager for Monarch.

• **A. R. Davis,** serving at Kansas City, has been appointed plant manager of Ford Motor Co.'s new Lincoln-Mercury assembly plant at Los Angeles. He will be succeeded at Kansas City by **R. N. Cocks,** the present superintendent. Plant manager of the new Lincoln-Mercury plant at St. Louis will be **P. S. Mabie,** plant manager at Memphis. Plant manager of the new Lincoln-Mercury plant at Metuchen, N. J., will be **R. J. Neville,** present superintendent at Edgewater. **Henry C. Dorsey,** Ford production man, has been named to the Ford Atlanta post.

• **Dr. W. Irving Clark** has retired from the position of director of personnel of Norton Co., Worcester, Mass. He will, however, continue to be in charge of the Norton plant hospital. Dr. Clark has been with Norton for over 35 years. **Harry E. Howard** has been appointed manager of personnel. He has been connected with Norton Co. for 33 years and for most of this period in various supervisory capacities in the abrasive division. For the last year he has been in personnel work.

ADRIAN D. JOYCE, chairman of the board of directors, Glidden Co.

• **Adrian D. Joyce,** president of the Glidden Co., Cleveland, since it was founded in 1917, has been elected chairman of the board of directors. He was succeeded as president by **Dwight P. Joyce,** who has been a vice-president and director of the company since 1927. **R. H. Horsburgh,** executive vice-president and a director since 1917, has been named vice-chairman of the board. **R. W. Levenhagen,** senior vice-president, was named chairman of the executive committee. New directors are: **John P. Ruth,** general manager, the Chemical & Pigment Div.; **Lovell Y. Pulliam,** general manager, Durkee Famous Foods Div.; and **Alexander D. Duncan,** general manager, the Paint & Varnish Div.

• **Stewart Walls** has been promoted to factory manager, and **C. C. Wickson** to plant superintendent of the Eaton Mfg. Co.'s axle division, Cleveland. Mr. Walls was formerly superintendent of the company and Mr. Wickson was supervisor of time study. **Sigmund Schultz** assumes Mr. Wickson's former position.

• **N. W. Seidel,** director of field operations, and **William J. Bird,** divisional operating manager, have been named vice-presidents of the Fargo Div. of Chrysler Corp., Detroit. Mr. Seidel has been with the division for the past 16 years, while Mr. Bird has 10 years' service.

• **John S. Gregg,** until recently manager of the Cincinnati district sales office of the Inland Steel Co., has been transferred to the company's Milwaukee office as assistant district sales manager.

• **Harry W. Carson** has been appointed manager of the mechanical department of the Dunkirk, N. Y. plant of the Allegheny-Ludlum Steel Corp., succeeding **Herbert R. Rose,** retired. **Patsy L. Scott** has been named night superintendent to succeed **John F. Baer,** retired.

• **E. O. Reese** has been appointed assistant superintendent of the hot strip mill and **George C. Brainard, Jr.** has been appointed assistant superintendent of the cold strip mill at the Campbell, Ohio plant, Youngstown Sheet & Tube Co. Mr. Reese joined the company in 1935 as a time study man, and became a day foreman in 1945. Mr. Brainard began in the blast furnace department in 1938, and was transferred to the cold strip department 2 years later. In 1945 he became a turn foreman and advanced to assistant general foreman last May.

• **C. A. Wiken,** for the past 8 years chief engineer of the Delta Mfg. Div. in Milwaukee, has been promoted to the position of vice-president in charge of engineering for the Rockwell Mfg. Co., Pittsburgh. **J. E. Ashman** has been named controller of Rockwell. He comes to the organization after 4 years with U. S. Steel as director of procedure for Carnegie-Illinois Steel Corp. **A. E. McIntyre,** who for the past several years has been manager of the Nordstrom Valve Div. plant in Oakland, Calif., has been transferred to Pittsburgh as general manager of the company's Pittsburgh Equitable Meter Div. He will also continue to serve as manager of the Nordstrom Valve Div.

• **William L. Hunter,** formerly chief engineer, has been named general manager for Northern Equipment Co., Erie, Pa. **Harold A. Schlieder,** who has been with Northern Equipment since 1936, succeeds Mr. Hunter as chief engineer, and **Francis W. Bunting,** who joined the company as a service engineer in 1935, has been appointed assistant chief engineer.

• **Frank S. Gibson,** secretary-treasurer of Gibson Refrigerator Co., has been elected vice-president and director of Apollo Mfg. Co., Apollo, Pa.

• **Norman C. Irion,** director of purchases for American Type Founders, Inc., Elizabeth, N. J., has been named general manager of Daystrom Laminates, Inc., of Daystrom, N. C. **Donald J. Gildea** has been appointed purchasing agent for the manufacturing division of American Type Founders, and **Everett Damon** assumes in addition to his other duties responsibility for the purchasing of all material for the American Type Founders Sales Corp.

• **Paul F. Neess,** formerly in the production department of the Perfex Corp., Milwaukee, has been advanced to manager of controls sales engineering. **Richard E. Toellner,** who has rejoined Perfex after 3 years in the Navy, has been made Detroit district manager.

• **E. B. Maire** has been appointed regional sales manager of the midwestern, southern and eastern branch office territories of General Controls Co., Los Angeles.

• **C. W. Culbertson** has been appointed metallurgical engineer for McNally Pittsburg Foundries, Inc., of Pittsburg, Kan. He will be in charge of their advisory technical service to casting buyers in the western half of the country.

• **Dan J. Forrestal, Jr.** has been appointed assistant to the director of industrial and public relations of the Monsanto Chemical Co., St. Louis. Mr. Forrestal was formerly assistant to the president of Park Aircraft Sales & Service, Inc.

• **Dr. Gabriel Bosschieter** and **Clarence D. Kirkeby** have become associated with R. M. Hollingshead Corp.'s coatings division, Camden, N. J. Dr. Bosschieter has most recently been assistant to the president, Reliance Varnish Co., and special representative of Calco Chemical Div., American Cyanamid Co. Mr. Kirkeby will have the duties of consulting engineer with the Hollingshead Corp. During the war from 1944 until recently, he was packaging field engineer for the U. S. Army Signal Corps.

JOHN F. BLACK, general superintendent, Buffalo plant, Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp.

• **John F. Black** has been appointed general superintendent of the Buffalo plant of the Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp., Denver. Before coming to the Wickwire Spencer Steel plant, he was associated with the Atlas Steels Ltd. plant at Welland, Ont., as assistant works manager.

• **William T. Allison** has been assigned to the Hartford, Conn. office of Universal-Cyclops Steel Corp.; **Walter S. Baker** has been assigned to Milwaukee; **William G. Beadling** goes to the Cleveland office; **Lorenz W. Rinek,** to Detroit; and **John L. Stewart** will report to the Chicago office. All men are veterans of the recent war.

• **Leland Hazard** has been elected to the board of directors of Pittsburgh Plate Glass Co., Pittsburgh, succeeding Robert L. Clause, who recently resigned. After engaging in the general practice of law for many years, Mr. Hazard became counsel for the company in 1938. The following year, he was named general counsel for the firm. He was elected vice-president in 1944.

• **Kenneth E. Hanson,** secretary and treasurer of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has been elected a director or the firm and **Kenneth K. Du Vall,** president of the First National Bank of Appleton, Wis., also has been elected to the board.

• **J. D. Yoder, D. J. Saunders, G. N. Proctor** and **H. L. Beohner** have been elected vice-presidents of the Permutit Co., New York.

• **Capt. M. E. Crist** has joined the Nitralloy Corp., New York, as executive vice-president and general manager.

• **E. A. Garber** has been elected a director and vice-president of Harbison-Walker Refractories Co., Pittsburgh, and has also been appointed general manager. Mr. Garber is vice-president of Northwest Magnesite Co., a subsidiary of Harbison-Walker Refractories.

• **Palmer E. Hanson,** engineer and sales executive in the foundry equipment industry for 25 years, has been named manager of the foundry molding equipment division of the Arcade Mfg. Div. of Rockwell Mfg. Co. The Arcade Div. is located in Freeport, Ill.

• **George H. Merrill** has been elected chairman of the board of Merrill Bros., Maspeth, N. Y. **Whitney Merrill** has been elected president; **E. Merrill Gardner,** vice-president and secretary; and **George Dunkenberger,** treasurer.

• **J. W. Myers,** formerly with the Wean-Broden Construction Co., has joined the Yoder Co., Cleveland, in a sales-engineering capacity. **Joseph U. Ridder,** recently with the Kane & Roach Co. and formerly for 18 years with the Dahlstrom Metallic Door Co., has joined the Yoder Co. as superintendent of its roll grinding department.

• **Howard C. Josephson** has been appointed general sales manager of Greene, Tweed & Co., North Wales, Pa. He formerly was assistant to the president of Clark-Babbitt industries.

• **Edward E. Helm,** sales vice-president of Reliance Electric & Engineering Co., Cleveland, has been elected a director of the firm to succeed A. M. MacCutcheon, retired.

• **George P. Lehmann** has been made manager of the General Electric Co. plastics division and **John L. McMurphy,** manager of the compound division. Both men will make their headquarters at Pittsfield, Mass.

"A NORTHERN HI-LIFT HOIST up there Would Slash Handling Costs"

An efficient Northern Hi-Lift . . . low-headroom Electric hoist saves in many ways:

1. labor saving

When men lift and move material by hand, the power generated costs you at least $5 per kilowatt hour. Power for a Hi-Lift Electric Hoist costs you less than a nickel per kilowatt hour. Manpower lifting is slow, time wasting, costly. Hi-Lift Hoists do it quickly, economically.

2. time and overhead saving

Inefficient, slow material handling causes delay and countless minutes of lost time all through the shop while other operations wait on handling. Hi-Lift Hoist saves this time and money.

3. saving through safety

Men handling heavy material by hand are subject to serious and costly injuries. Power handling avoids these.

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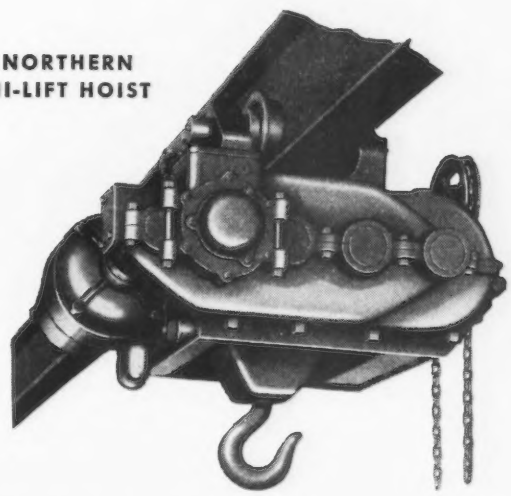
Northern Hi-Lift Hoists use *no* floor space—carry the material above the floor. There is no vehicle wear on the floor—no danger to workers from rapidly moving vehicles. Aisles are used for work and walk space only—a substantial saving in space. The low-head-room feature of Hi-Lift Hoists makes better use of overhead space—permits handling of bulkier loads.

NORTHERN HI-LIFT HOIST



Northern Hi-Lift Electric Hoists are extremely sturdy, long lasting. Write for Bulletin H-3.

1542

NORTHERN ENGINEERING WORKS

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TYPES OF NORTHERN HI-LIFT HOISTS AVAILABLE

Floor controlled hoists • *Motor traveled hoists*
Cab controlled hoists • *Base mounted hoists*

Dear Editor:

STRIPPING COPPER

Sir:

We are interested in securing information on how to strip copper from steel after it has been copper welded, and would appreciate any information you can send us on the subject.

S. F. GRAHAM
Allbrite Plating Works
Chicago

● The following formula has been suggested for stripping copper from copper-welded steel: Sodium sulfide, 28 oz, sulfur, 2 oz, water to make 1 gal. Boil to dissolve sulfur. Using at room temperature, immerse work for 5 min and brush off loose sulfide. Repeat several times. Rinse and dip in 10 pct sodium cyanide solution and brush. If any deposit remains, repeat procedure.—Ed.

PRICE INTERPRETATION

Sir:

We wish to inquire regarding the interpretation of the iron and steel prices which you publish in each issue. Take for instance your issue of Jan. 16 where structural shapes are listed at 2.50¢ per gross ton f.o.b. the Pittsburgh basing point. Certain price data supplied by a large manufacturer quoted 2.55¢ from the same point and in answer to our inquiry we were informed that the difference was accounted for by a Pittsburgh switching charge. We would be glad to have your comments.

H. C. PRATT
Purchasing Agent
Vermont Marble Co.
Proctor, Vt.

● Local switching charges are not included on prices which we quote because they would be a misleading factor in determining basing points and calculating delivered costs of steel products.—Ed.

THREAD ROLLING

Sir:

I have been reading with much interest the articles on "Thread Rolling —Theory and Practice" by J. W. Batchelder of Ascutney, Vt., the latest and second article appearing in the Dec. 26 issue, p. 55. I am anxious to ascertain if reprints of the completed three part article could be obtained for use and study by some of our engineers. Three copies would be of much use to us.

J. E. GILCHRIST
Tool Engineer
Walworth Co.
Greensburg, Pa.

Sir:

If available, we would appreciate one or two copies of the articles on thread rolling that appeared in the Dec. 19 and 26 and Jan. 9 issues. . . . The articles show that the author has a very intimate knowledge of thread rolling, and we would like to see more articles concerned with the manufacture of cold headed parts, such as nails, rivets, screws.

THEODORE B. SMITH
President
John Hassall, Inc.
Brooklyn

● Copies of the article are being forwarded to you with our compliments.—Ed.

PHOTOGRID ANALYSIS

Sir:

The issue of Sept. 12, 1946, contains an article on photogrid strain analysis in which the statement was made that this is the first published report describing the use of the photogrid process. This statement is in error as the technique has been described in at least three prior publications. . . Some of the previous descriptions are: G. A. Brewer and R. B. Glassco, "Determination of Strain Distribution by the Photogrid Process," J. Aeronaut. Science, Vol. 9, November, 1941; G. A. Brewer, "Measurement of Strain in the Plastic Range," Proc. Soc. Exptl. Stress Analysis, Vol. 1, No. 2, 1944; and C. P. O'Haven and J. F. Harding, "Studies of Plastic Flow Problems by Photogrid Methods," Proc. Soc. Exptl. Stress Analysis, Vol. 2, No. 2, 1945.

GLENN MURPHY
Professor of Theoretical and Applied Mechanics
Iowa State College
Ames, Iowa

● Prof. Murphy is correct. The article was actually the first published report of the extensive work done at Case School of Applied Science on photogrid strain analysis. The cause of the false impression was in our making too general a statement on the status of that article. The authors emphasize that priority for the original development of the technique should go to G. Brewer.—Ed.

LOST WAX PROCESS

Sir:

I am advised that you have available a reprint of nine articles entitled "Precision Casting, Lost Wax Process." Since I am very much interested in the lost wax casting process, I would appreciate your sending me a copy of this reprint.

RICHARD E. HORTON
2746 W. Melrose
Chicago

● The booklet, "Precision Casting — Lost Wax Process," contains 12 articles that we have published on precision casting. Copies are available to readers at $1 each.—Ed.

INDUCTION BRAZING

Sir:

If tear sheets are available will you please provide them for the articles "Designing for Silver Brazing With Induction Heating" and "Old Line Swedish Steel Companies Planning Expansions" appearing in the Dec. 26 issue, p. 62 and 106.

PAUL F. BERG
Technical Information Dept.
Selas Corp. of America
Philadelphia

PYRITE-ALUMINUM POWDER

Sir:

In the "Newsfront" section of the Nov. 28 issue, mention is made of a new powder metallurgy development involving a pyrite-aluminum composition. I shall appreciate any information available regarding source of manufacture . . .

E. J. WELLAUER
Supervisor Research and Metallurgy
Falk Corp.
Milwaukee

● Mr. Earl S. Patch, Patch & Talmadge, Stamford, Conn., can supply further information on this powder metallurgy development.—Ed.

CABLE FROM SWITZERLAND

PUBLICATION OF ARTICLE ISSUE NOV 14 PAGES 96 TO 98 TRANSLATION WANTED FOR TECHNISCHE RUNDSCHAU BERNE BY BROWN BOVERI BADEN SWITZERLAND PLEASE GIVE AUTHORIZATION

BROWN BOVERI

BEARING MATERIAL

Sir:

We would appreciate having four extra copies of Norman E. Woldman's two articles on sleeve bearings: "Selecting Nonferrous Bearing Material" which appeared in the Sept. 5 issue and the second, entitled "Characteristics of Aluminum Bearings" appearing in the Sept. 12 issue. Inasmuch as we are in the petroleum business these articles are extremely interesting to us and add materially to the value of THE IRON AGE to us.

J. D. MUNSELL, JR.
Kendall Refining Co.
Bradford, Pa.

● Author Woldman has reprints of the articles and would be glad to furnish you copies if you write to him at 356 N. Mountain Ave., Upper Montclair, N. J.—Ed.

USEFUL INFORMATION

Sir:

Please consider this a request for one copy of your book entitled "Directory of Tool Steels." In my position in the Tool Design Section of the Detroit Arsenal I would use the information it contains very frequently.

EDWARD L. POE
Chief, Tool Design Section
Detroit Arsenal
Center Line, Mich.

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Industrial News Summary...

- **Scrap Mixup Is Worst in History**
- **Remote Purchases Disrupt Market**
- **Ingot Rate Unchanged at 93 Pct**

UNBRIDLED bidding between steel companies for scrap located in districts remote from the mills has caused one of the worst cases of maldistribution in scrap market history and at the same time precipitated some of the highest delivered prices for scrap on record. Practically every large mill is and has been going into territory far removed from the point of consumption and bidding up prices to which must be added substantial freight charges in order to deliver the material to the openhearths.

Even though scrap quotations in the local markets of Pittsburgh, Youngstown and Philadelphia have been advanced this week, practically all quotations in the major steel centers such as Pittsburgh, Chicago, Cleveland and Youngstown are almost meaningless in view of the inability of consumers to pick up tonnages there at current quotations. Representatives of Pittsburgh steel companies are paying as much as $36 to $39 a ton in order to bring material in from such points as New York, Boston and Philadelphia.

In Chicago some large consumers are paying as much as $33.50 to $34 a ton delivered in order to bring material in from the Middle West and from Texas locations, while the local price remains static with little or no tonnage moving at that figure.

ONE of the basic reasons for the runaway scrap market is the tie-in and earmarked sales of scrap which grew up because of the tight steel situation. Some steel companies are still engaging in sales practices which require that the consumer of steel furnish a stipulated tonnage of scrap in order to obtain steel supplies. In some cases these same consumers have entered the scrap market and bid the price up beyond what would have normally been the case had regular brokers and dealers been allowed to ply their trade in a normal manner.

Some major railroads have been unable to obtain some of the lush scrap prices because of the customer relationship between steel companies and the railroads due to the fact that the carriers are fearful to take any step which might react unfavorably on their ability to obtain steel supplies. Large manufacturers as a general rule earmark their scrap for return to steel companies which supply them with new steel. In most cases these manufacturers are not receiving some of the higher scrap prices which are representative of spot market sales and involve dealers' material which supplements the other scrap which normally flows to steel furnaces.

Because of price advances in Philadelphia and Pittsburgh, THE IRON AGE scrap composite price has been advanced from $31 a gross ton to $31.67, an increase of 67¢ a ton. This composite, because of the unusual conditions existing, does not reflect some of the much higher remote prices which are being paid by some scrap consumers. Markets have also advanced at Birmingham, Buffalo, Boston, Youngstown, New York, St. Louis and Cincinnati.

Had it not been for an outlaw strike at the Aliquippa works of Jones & Laughlin Steel Corp., and a shortage of gas in the Pittsburgh district the national steel operating rate would have shown some increase this week. Because of these factors the rate is unchanged at 93 pct of rated capacity which still reflects the new peace-time peak reached last week. There were no indications this week that the operating rates would fluctuate to any extent from the present high levels.

IF steel company earnings for the fourth quarter of 1946 are any criterion, net profits for the first quarter of this year will reflect an even higher figure unless reduced by wage increases or a softening in steel prices. The former is a definite probability while the latter is only a remote possibility unless some unusual action or set of circumstances should prevail. Steel price increases which generally became effective during the latter part of December 1946 and January of this year were not reflected in the 1946 fourth quarter earnings of steel companies.

West Coast steel prices came into focus this week with Bethlehem Pacific Coast Steel Corp. making known basing points on merchant and concrete bars at Seattle, San Francisco and Los Angeles. Kaiser Steel already has delivered prices on plates, bars and structurals at Los Angeles, Seattle, San Francisco, Portland, Stockton and Sacramento. Columbia Steel, U. S. Steel subsidiary, is said to be planning to announce basing point delivered prices on merchant bars, concrete bars and other products at Los Angeles and San Francisco basing points. Other independent producers on the Coast are quoting f.o.b. mills but the new basing points on products made on the Coast may open up the muddle which now exists on the entire West Coast pricing setup.

THE action of one steel mill in the Pittsburgh district in agreeing to keep a maintenance of membership clause in its contract with the union may be a straw in the wind as to what action other companies may take. According to informed sources some steel companies are agreeable to keeping a maintenance of membership feature providing the union agrees to retain that portion of the present agreements which allows employees to withdraw from the union if they so desire during a 15-day period after new contracts have been negotiated.

Wage negotiations which are to be resumed this week between U. S. Steel and the USWA will continue to deal with noneconomic issues until the portal-to-portal suit problem has been solved. It is probable, however, that the U. S. Steel Corp. and the union will agree on a wage increase much sooner that Apr. 30, the deadline on the contract extension.

• **CHARGES CABLE COMPANIES**—The Justice Dept. has filed suit in the Southern District Court of New York charging four corporations with conspiring to monopolize and restrain trade in the high tension cable industry. Seeking "relief against patent abuses" and cancellations of alleged price and marketing agreements the government suit names as defendants: General Electric Co., General Cable Corp., Okonite-Callendar Cable Co., and Phelps Dodge Copper Products Corp., all of New York.

• **COMPANY SECURITY**—Experience of the Ford Motor Co. would indicate that company security is important in maintaining good labor relations. From 1941 to 1945 Ford had 773 illegal strikes. Since obtaining company security in its UAW-CIO contract Ford has had 154 work stoppages—131 in 1945 and only 23 in 1946. While Ford does not attribute all of the gain to company security it believes security provisions were definite steps in the right direction.

• **STEEL CASTING SHIPMENTS**—Shipment of steel castings during October totaled 138,000 short tons, an increase of 9 pct over September. The October figure was exceeded only during April this year when 146,000 tons were shipped. Carbon steel castings accounted for 77 pct of the aggregate and alloy steel castings for 23 pct.

• **LIQUID ASSETS**—According to Dr. Marcus Nadler, nationally known economist, liquid assets in the hands of individuals and business at the end of 1945 amounted to $221 billion. Since that time, the economist estimates that the purchasing power of the dollar has decreased by 17.8 pct, causing a shrinkage in the purchasing power of these assets by about $39 billion.

• **PIG IRON OUTPUT**—Merchant furnaces, hard pressed by consumers for greater quantities of iron, have just about reached the breaking point. It is estimated in one major area alone that iron production during February will be just about 10,000 tons less than is required by foundries, a deficit that will have to be made up with scrap or foundries will close down. This means a stronger foundry scrap market and likely even higher prices.

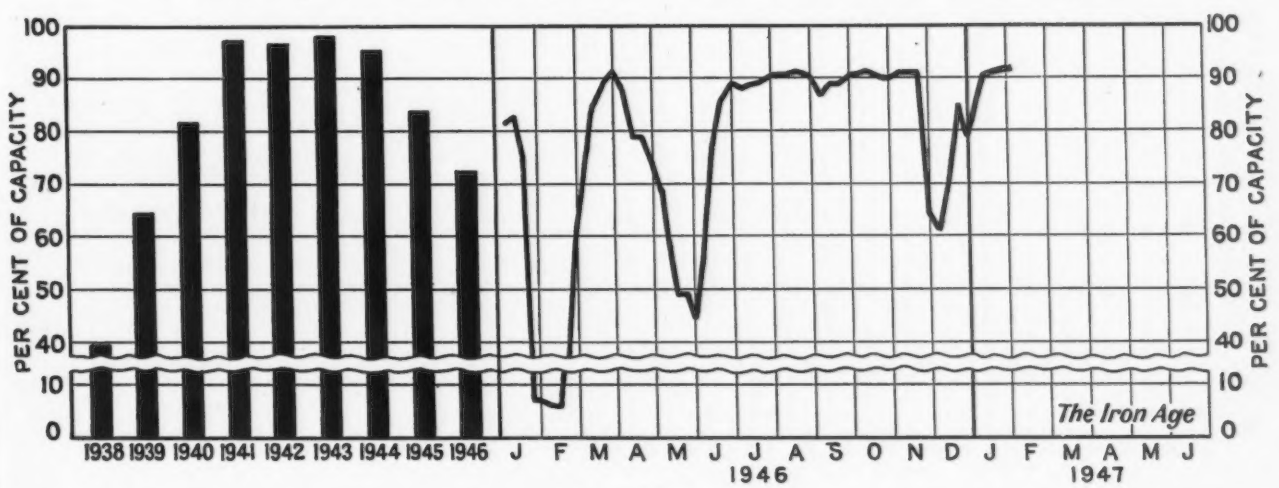
• **SURPLUS INVENTORIES**—WAA inventories continued a downward movement during the fourth quarter of 1946 while for the same period the disposals of surplus showed a slight gain, Robert M. Littlejohn, WAA Administrator, has reported. Sales for the quarter, including leases of real property, totaled more than $2 billion in reported costs; acquisitions for the same period amounted to $1.4 billion. Declared surpluses as of Jan. 1 amounted to about $9.5 billion and an additional $6.5 billion, at least, remains to be declared—leaving the known surpluses for disposal at around $16 billion. Roughly speaking, approximately $13 billion has been liquidated.

• **MINORITY RULE**—Eighteen men on strike at the Jones & Laughlin Steel Corp., Aliquippa Works, shut down the entire iron and steelmaking units as well as all semi-finishing mills. One crew, six men, disgruntled over certain demands made last November that the company alleges were settled through grievance procedure, struck and closed down three bessemers, five openhearths, two blast furnaces, blooming mills, bar mills, soaking pits and the 14-in., merchant mill, putting 2500 men out of work. The striking men were CIO-USWA yard engine operators.

• **WEST COAST BASING POINTS**—Basing points are soon to be announced or already announced by some West Coast steel makers. This move will take place as the result of the elimination of old arbitrary points which were based on a rail-water freight rate which was not used much if any during the war. Recent changes in selling practices resulted in the withdrawal of arbitrary West Coast basing points with the substitution delivered prices from proper basing point. Now most West Coast firms will announce basing point prices for those items which are made at West Coast points. Some will be f.o.b. others will be delivered.

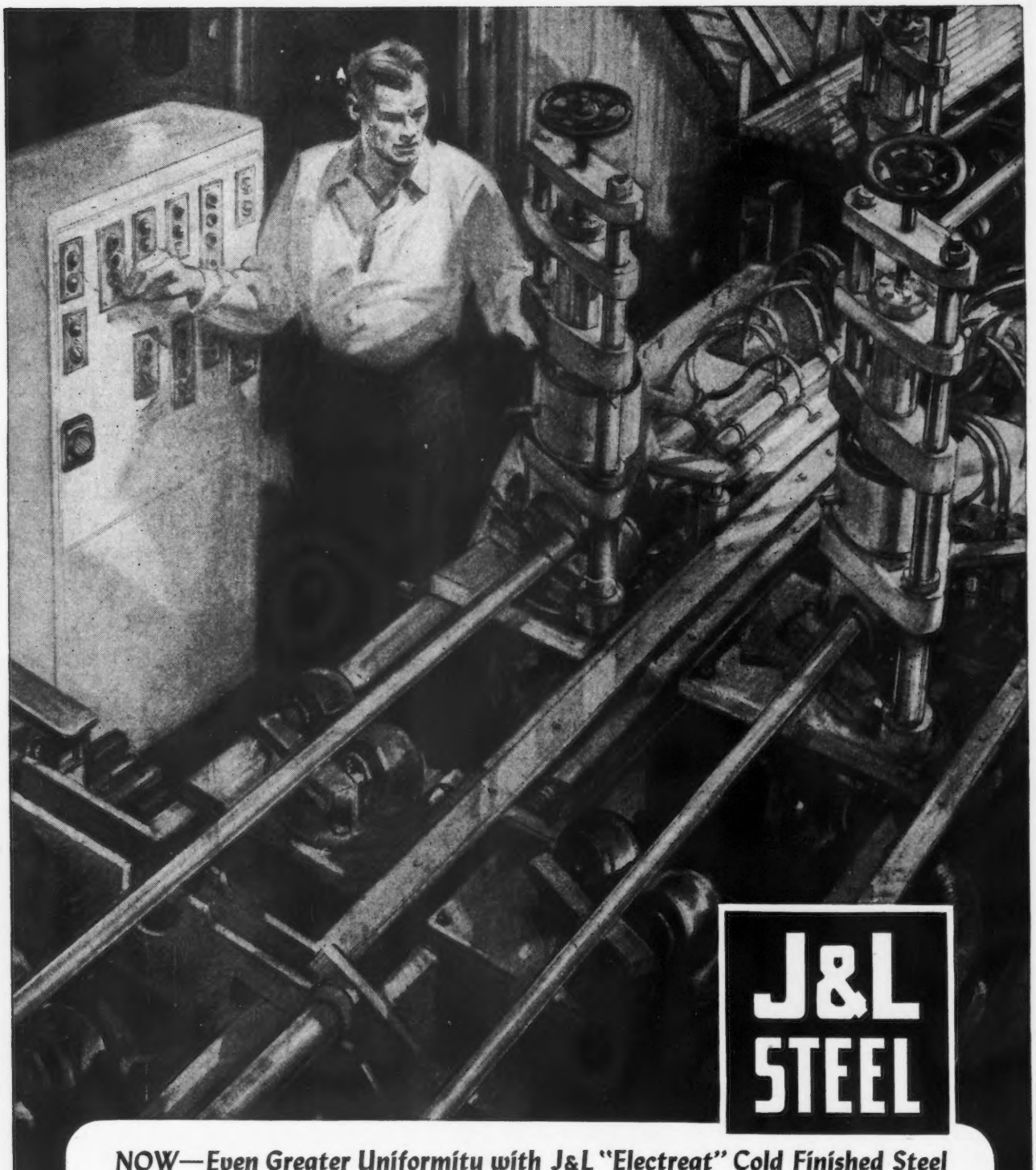
• **ALLOW LUSTRON LOAN**—RFC has approved a $12.5 million loan to Lustron, Inc., Chicago firm which will build porcelain enamel steel prefabricated houses in part of the Columbus, Ohio, Curtiss-Wright plant. Approximately $5 million will be spent for equipment and tooling to produce at a hoped-for peak of 100 a day by September, or a total annual output of 15,000. The larger, or 35 x 32-ft house, will sell for $7100 erected but not including lot.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 28.....	102.0	90.5	90.0	93.5	97.0	102.5*	100.0	99.0	102.5	90.0	94.0	76.0	95.0	93.0
February 4.....	98.0	91.5	93.0	93.0	100.5	104.0	100.0	99.0	102.5	103.0	104.5	76.0	84.0	93.0

* Revised.



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JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

Outlook for First Quarter Earnings Seen Bright for Steel

But Influences Such as Wage Increases, Steel Demand May Change Picture

o o o

By TOM CAMPBELL
News-Markets Editor

o o o

New York

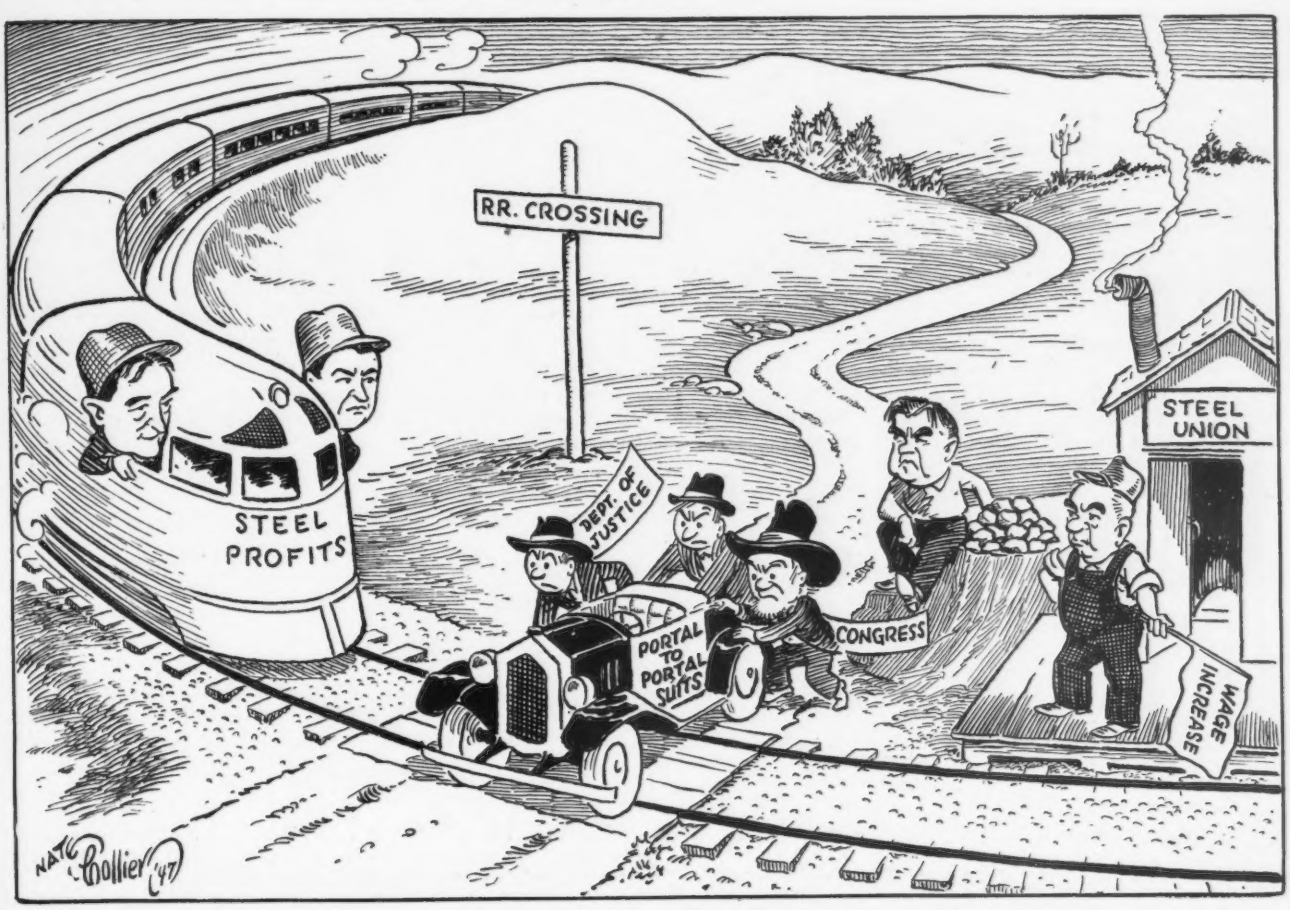
• • • If steel company earnings for the fourth quarter of 1946 are any criterion, net profits for the first quarter of this year will reflect an even higher figure unless deflated by wage increases or a softening in steel prices. The former is a definite probability and the latter a remote possibility unless some unusual action or set of circumstances should prevail.

Returns from seven large steel companies which represent about 73 pct of the industry's total ingot capacity show 1946 earnings to be about 45 pct above those for 1945. It was necessary in most cases, however, for steel companies to reach into special funds withheld from previous earnings in order to offset losses induced by the 1946 steel strike. Most emphasis, however, is now being placed on an analysis of earnings during the third and fourth quarter of 1946 which were relatively free from labor disturbances.

Steel company earnings during the last quarter of 1946 hardly reflected the price increases which were made effective during the latter half of December. For this reason earnings during this quarter will be closely scrutinized by steel officials, those looking out for stockholders' interests and top union heads. The extension of the steel labor contracts until Apr. 30 of this year will give the United Steel Workers of America ample chance to see the results of the industry's first quarter operations.

In the case of U. S. Steel Corp., fourth quarter earnings were almost as great as those during the third quarter (during that quarter the company had some nonrecurring net income), while operations during the fourth quarter were 87.4 compared to 94.3 pct of capacity in the third quarter of 1946. In the case of the year 1946 if the amounts taken from a special account are deducted from net income, the result wuld be similar to the net income in 1945, when the corporation showed a profit of $58 million. However, during 1946 the company operated at an average of only 73 pct while in 1945 it

Slowdown Ahead?



Bethlehem Steel Earning in Brief

Item	Fourth Quarter 1946	Third Quarter 1946	Fourth Quarter 1945	Year 1946	Year 1945
Net Income	$11,937,281	$10,543,005	$11,447,858	$41,731,931	$35,947,116
Per Common Share	$3.45	$2.99	$3.29	$11.79	$9.52
Sales in $ Millions	$226	$224	$225	$788	$1327
Per cent Ingot Operations	85.1	97.9	83.1	77.6	91.7

operated at 82 pct of capacity. The assumption can be made that the breakeven point during the last half of 1946 was lower than was the case in 1945.

With the corporation currently operating at more than 96 pct of capacity and with the price structure at a higher level, it appears obvious according to financial sources that the breakeven point will be further reduced unless wage increases are charged against first quarter earnings, which will probably be the case. Generally speaking most steel companies were able during the last quarter of 1946 to make a return almost equivalent to the third quarter of that year but at an operating figure ranging from 6 to 10 points less.

According to informed sources, it is too early to allow 1946 earnings to be taken as a definite base from which to draw conclusions as to what might occur during the first half of this year. A falling off of demand, a moderate wage increase, social benefits, and a change in steel prices could combine in part or in all to change the picture considerably from its present outlook.

One thing appears certain—steel operations during the next 3 months will definitely establish a new peacetime high. In order to do this, however, steel firms are paying considerably more for scrap supplies by depending more and more on the purchase of remote scrap with local markets practically drying up.

Steel Company Earnings Statements Show Gain For 1946 Operations

Pittsburgh

• • • **Jones & Laughlin** Steel Corp. reported for the quarter ended Dec. 31, 1946, a consolidated net income of $4,744,824, and for the year ended Dec. 31, 1946, a net income of $10,854,084. Net income for the same quarter of 1945 totalled $2,367,774, while the earnings for the year of 1945 totalled $8,082,082.

Sales and operating revenues for the company for the last quarter of 1946 were $73,389,063, as against $57,140,251 during the same period of 1945. Sales and operating revenues during 1946 were $247,009,461, down from $284,741,818 during 1945.

•

Chicago

• • • **Inland Steel Co.**'s reports net income of 1946 of $15,556,897. This compares with net income for 1945 of $9,861,210. The 1946 income was equivalent to $3.18 per share compared to $6.04 per share in 1945. However a three-for-one split up of capital stock was approved by stockholders Apr. 24, 1946. Net sales and other revenues in 1946 amounted to $218,756,983, compared with $218,021,133 in 1945.

•

Youngstown

• • • **The Youngstown Sheet & Tube Co.** preliminary report shows for 1946 a net profit of $14,254,905 compared with $7,512,250 in 1945. The fourth quarter profit, after year-end adjustments, was $5,078,510. Net sales and other revenues last year were $218,487,054 and the federal income tax provision was $9,275,000.

•

Cleveland

• • • **Republic Steel Corp.** reports a consolidated net income for 1946 of $16,033,468, equal to $2.53 a share of common stock. The consolidated net income for 1945 was $9,543,443 or $1.36 a share.

Provision for federal income taxes was $9,000,000 last year, compared with $17,100,000 for income and excess profits taxes the year before. Earnings in 1946 were 5.3 pct on investment and 3.86 pct on sales. Sales for the year aggregated $415,749,805 compared with $500,815,191 in 1945.

•

Wheeling, W. Va.

• • • **Wheeling Steel Corp.** reports a net profit for 1946 of $5,372,910 after all charges and taxes, but before deducting a net loss of $2,012,522 charged directly to surplus as a result of the sale of the Portsmouth plant consummated last July 1.

The profit is equivalent to $6.25 a common share. The net profit for 1945 was $3.950,252, or $3.75 a common share.

Sales last year were slightly under $110,000,000 and compared with the 1945 volume of $143,154,065.

U. S. Steel Corp. Earnings in Brief

ITEMS	Fourth Quarter 1946	Third Quarter 1946	Fourth Quarter 1945	Year 1946*	Year 1945
Net Income	$31,215,636	$33,329,353	$13,267,300	$88,683,530	$58,015,056
Dollars Per Share	$2.86	$3.11	$.80	$7.29	$3.76
Sales in $ Millions	$489	$410	$370	$1485	$1740
Shipments—Net Tons	4,902,742	4,457,557	4,096,568	15,247,752	18,410,264
Percent Ingot Operations	87.4	94.3	72.4	72.9	82.0
Average Employees	275,805	276,793	261,871	266,727	279,274
Total Payroll	$195,602,340	$194,888,029	$162,456,418	$694,114,463	$788,721,918
Average Pay Per Employee	$709	$704	$620	$2602	$2817
Percent Payroll to Sales	41.8	47.6	44.1	46.7	45.2
Net Income Per Ton of Shipments	$6.37	$7.48	$3.24	$5.82	$3.15

* Steel Strike in 1946 for about 1 month with complete shutdown except maintenance men.

Complex Factors Seen Holding Scrap Market in Firm Grip

Cross Hauling, Earmarking And Tie-In Sales All Work To Keep Quotations Up

o o o

By GEORGE F. SULLIVAN
Ass't News Editor

o o o

New York

• • • **Current scrap steel** prices, pushed to all-time record highs by a series of complex factors since the end of price control, would be extremely vulnerable should these factors be removed or weakened. This, the considered opinion of several qualified observers, is based on a study of practices now prevalent in scrap trading which were either insignificant or nonexistent in prewar scrap markets.

These sources, considering the new factors dominating the market, believe that many if not all of them will be on their way out later this year, accompanied by scrap price declines. There are some who hold that any general softening in the price level later this year will see scrap prices moving down at a much faster rate than they went up.

Long recognized as contributing to the present disorganized conditions are: (1) Cross hauling, (2) earmarked shipments, and (3) tie-in sales. To these have been added a new bullish factor, the prospect of excellent steel company production for the first quarter of 1947.

Cross hauling, which is said to be based upon the scrap shortage, admittedly does not add a single ton of scrap to the national total. Conceding this point, steel scrap purchasing agents insist that the term be not confused with long hauls of scrap from remote nonconsuming scrap districts such as the farming areas of the South and Southwest.

A scrap broker, privately asserting that cross hauls wherein one steel mill buys in territory which normally serves another are an unnecessary burden on steel producers, nevertheless asserted that brokers were powerless to prevent them. In the past, he said, the broker acted as a traffic manager to reduce overall freight charges on scrap shipments by redirecting the tonnage in many cases.

Earmarking of scrap, defined as the process whereby a steel consumer returns scrap to his steel supplier, is not new but trade sources report that the practice, which grew to much larger proportions during the OPA, has not declined. While it is reported that most earmarked material still moves through normal brokerage channels, most of it is not traded on a free market and therefore its volume has no effect on prices.

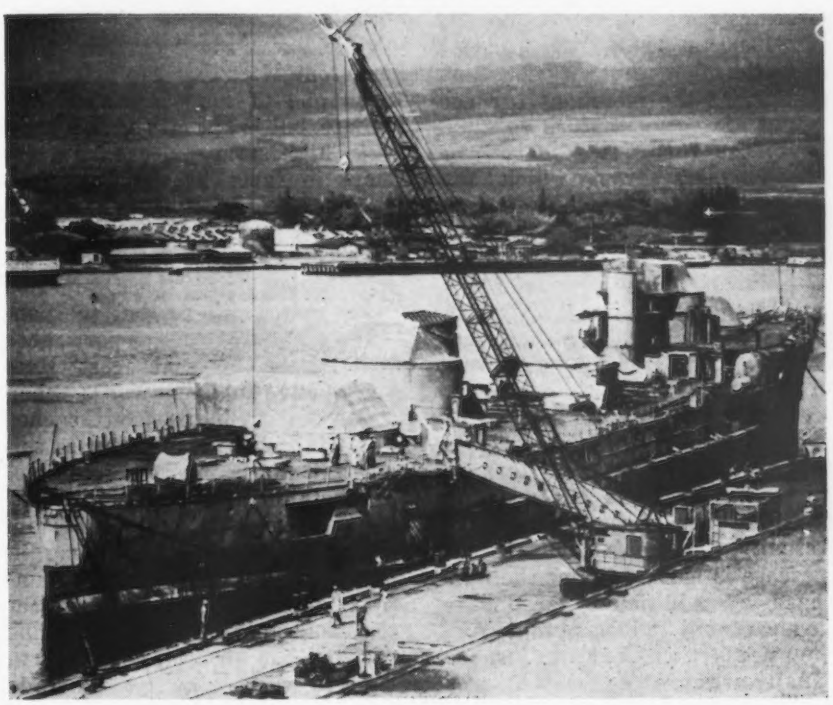
What is generally known in the trade as a tie-in sale is one in which a steel producer is offered a certain tonnage of scrap if he will in turn sell the scrap purveyor a given tonnage of new steel. The scrap purveyor, it is reported, then takes advantage of the tight steel supply situation, to resell this steel at a substantial profit.

It is reliably reported that tie-in sales account for an exceedingly small proportion of total steel shipments. Nevertheless, the shrewd operator who sees a handsome profit in reselling his new steel often moves into the open scrap market and bids up the price.

The latest contribution to a bullish feeling, said to be especially prevalent in dealer circles, is the apparently bright steel picture at least for the first quarter of this year. One dealer remarked that the steel companies did not appear to have been seriously affected by the scrap price advances during the last few months of 1946.

Listing the changes which may come later this year and may have a depressing effect on scrap steel prices, one observer remarked that if the "corrective period" which THE IRON AGE indicated might come later in 1947 (Jan. 30, p. 99) for the steel industry caused a drop in steel demand, a decline in scrap prices appeared inevitable. He further forecast that such a

SIC TRANSIT GLORIA MUNDI: *Once the pride of the U. S. fleet and more recently subjected to the ignominy of being the first battleship sunk at Pearl Harbor, the U. S. S. Oklahoma is readied at Pearl Harbor for a slow trip to the West Coast where she will be scrapped by the Moore Drydock Co.*



decline would be quicker and sharper than the recent scrap price rises.

Current high prices are bringing the scrap peddler back into business. A dealer in Philadelphia commented that the line of peddlers waiting to get on the scales at his yard was most unusual for these days and this time of the year. It was indicated that if prices hold near present levels the volume coming in from peddlers would be substantially larger this spring.

Finally, it is said that while steel mill scrap inventories are small the weather has held good for a longer than normal period and while some snow trouble has already hit Chicago and may be ahead elsewhere at least half the winter is over. In view of this it is considered possible in some scrap circles that buyers may begin to turn thumbs down on tie-in sales and show stronger price resistance.

At least one steel scrap purchasing executive has privately admitted that the scrap industry alone could not be blamed for present prices and practices. This inference that buyers are partly responsible may, some observers believe, resolve itself by the elimination of some of those practices which have contributed to record high scrap prices.

Brooke Boost May Herald General Pig Iron Price Rise

Observers Cite Unusual Spread Between Current Prices For Scrap and Pig

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By THOMAS E. LLOYD
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • Some observers point to the increase in pig iron of $3.00 a ton last week by E. G. Brooke & Co., Birdsboro, Pa., as the beginning of another general increase in iron prices. They expect that the next price increases will be made by southern furnaces and then it will be only a matter of time until all merchant furnaces will follow suit.

Aside from the fact that iron producers—many at least—are dissatisfied with the last price increase, there is the galling realization that they are selling iron for prices in the $30 to $34.00 range, while cast scrap, often of a very inferior grade, is bringing upward of $40.00 a ton. This, coupled with the fact that a good percentage of the merchant furnace output is pegged for housing, limits the furnaces from selling to customers from which the greatest profit per ton of iron shipped could be made.

Housing officials point to the fact that their premium of $12 a ton has brought into operation plants at Gadsden, Chicago, and Everett, Mass. However, observers in the field state that the increased volume of pig iron made available from the offer of $8 a ton for production over a furnace quota has brought little or no profit to the furnace operator. Actually, they point out, if the increase is made without the purchase of additional scrap, the furnace could and does profit from the production, but a furnace usually uses greater scrap charges for this premium production and the higher scrap costs offset the gain of $8 a ton. Again, there is always the question of shipping to non-desirable customers and absorbing freight that otherwise would be eliminated by sales closer to home on non-certified orders.

The question of directly tying pig iron prices to scrap prices has been one of long argument and debate, but is appears at this time, with high scrap prices, there are more in favor of the idea than ever before. Proponents of higher pig iron prices, and there are many in the industry, indicate that with higher prices there would be more iron available, but the penalty would be a proportionate curtailment of high cost steel operations. In other words, when the profit from pig iron reaches the point where it is better to sell pig iron than convert it into steel products on high cost equipment, then steel mills will sell iron. Further, any major increase in pig iron prices would send foundries now holding iron certification scurrying for scrap and thus decrease the pig iron demand.

As to whether or not the trade would stand another price increase in pig iron, it is only necessary to examine what is happening in the New England area today. Iron is coming into that area at $70 a ton f.o.b. Liverpool, England, and some furnace operators have had offers for domestic iron of something in the neighborhood of $50 a ton. Further, many pig iron customers are said to be willing to buy spiegeleisen—if they could get it—at $40 to $44 a ton to utilize the 80 pct iron that it contains. Spiegel producers could sell every pound they could make to what are normally pig iron users, according to one source.

Furnace operators state that housing certified foundries are getting all the iron they need. This statement, of course, is a generality that probably some foundry operators would deny. However, the furnace operators state that housing certifications are leading to a great deal of iron "bootlegging." One member of the industry claimed knowledge of a case where a scrap dealer in the South covered a carload of iron with some cast scrap and sold the entire carload as cast scrap. Further, there have been reports, unconfirmed but nevertheless persistent, that scrap dealers have been offering pig iron for sale at premium prices. It is held that the only obvious source of this iron is from certified foundries that are getting more than they can consume and are disposing of it through diversified channels.

Canadians Expect Some Iron and Steel Price Increases

See Some Controls Easing Soon In Face of Rising Costs; Hoarding Alleged

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By F. SANDERSON
Canadian Contributing Editor

o o o

Toronto

• • • **Canadian price ceilings** on iron and steel remain unchanged from levels established almost a year ago, despite the steadily upward movement in price levels in the United States, the advance in Canadian base metal prices and increases in many lines of consumer goods. However, with soaring production costs which have been manifest in Canadian industry in the past few months it is expected in some quarters that the Wartime Prices and Trade Board soon may cooperate by lifting ceiling prices on steel, at least on a few items.

There seems to be a strong feeling throughout the trade, and among a number of industrial leaders, that Canada may abandon price control almost entirely and that this step may be taken within the next two months. In the meantime Canadian steel producers who have been accepting orders with prices to be made known at time of shipment will be in a position to take advantage of any price increase that may materialize.

In prewar years most Canadian iron and steel prices were based on Pittsburgh prices, plus duty, freight and exchange, but in recent years this method of reaching price levels has been abandoned and prices in this country are under control of the Wartime Prices and Trade Board. Cold-rolled strip and sheets, however, are exceptions and the domestic prices for these materials are the same as those quoted by U. S. producers delivered Toronto. These exceptions are due to the fact that cold-rolled strip and sheets are comparatively new items to Canada's production list and at the moment have small production ratios. However, output of the cold-rolled material will be stepped up considerably when Steel Co. of Canada, Ltd., completes its new unit at Hamilton and goes into production, probably in 1948.

The following price comparisons, in cents per pound, give an idea of the spread in Canadian steel prices against United States steel delivered Toronto:

	Canadian Price	U. S. Price
Sheets 10 ga, hot-rolled	3.05	3.45
Cold-rolled strip	3.20	3.20
Carbon Bars ¾-in. round	3.00	3.75

Not only are U. S. base prices above domestic prices, but Canadian steelmakers are using old quotations on the various extras, although these have been advanced recently in the United States and will result in an even greater spread in domestic and import prices.

Some Canadian industrial leaders favor complete abandonment of price ceilings and controls, pointing out that under free markets, prices would adjust themselves to their proper levels and business would return to a more competitive basis. On the other hand, Government officials believe that by retaining price controls, Canada has a better chance of getting by without chaotic inflation and runaway prices.

Steel consumers and the ultimate buyers of finished goods, have their own ideas on the subject, and the majority in these groups favor higher prices providing they are reflected in increased supply. It is claimed there has been hoarding of steel and steel products, though not among primary producers, for speculation purposes and it will take higher prices to bring any large flow of materials into the market.

Black markets appear to be in a position to supply many materials and products, thus it is pointed out that if black market prices will bring forth supplies, a boost in ceiling prices would have a tendency to bring out commodities that are being held for larger profit. While it is expected there will be wide scale discarding of price controls on durable goods within the next couple of months, it was announced in the House of Commons last week that new legislation may be introduced to maintain control on some commodities.

During the war years about 90 pct of Canada's steel output was diverted into war channels with the result that ordinary branches of industry were starved for supplies and production of consumer goods was given only minor consideration. While steel again is passing through the normal peacetime channels there is still some control and regulations regarding supplies to the more essential consumers. In the past year there was a large increase in manufacture of many types of consumer goods, but despite this fact there is a serious shortage of motor cars, trucks, tractors, agricultural implements, household electrical appliances, sanitaryware, tools, machinery and equipment.

It is learned from reliable sources that shortages in Canada are largely due to the fact that large quantities of the materials produced are for disposal in the export markets. Motor cars, trucks, tractors and agricultural implements have been specially featured in Canadian export trade while it is said that domestic consumers are being largely disregarded insofar as supply is concerned.

Car Registrations Decline

Detroit

• • • **New passenger car** registrations for the month of November are expected to reach 200,000 as compared with 225,180 registrations in October, according to R. L. Polk & Co., Detroit, statisticians for the automotive industry.

Total registration of new cars for the year-to-date is 1,482,996, the agency said.

New passenger car registrations from 45 states in November totaled 179,959 as compared with 125,287 in November 1941 from the same states.

Truman Recommends All But Three Titles of War Powers Act Be Dropped

Washington

• • • **Scrapping** of all but three of the remaining seven titles of the second War Powers Act was recommended this week by President Truman in a special message to Congress. He specifically asked, however, that titles 1, 3, and 5 be extended for 1 year beyond the present expiration date of Mar. 31.

Extension of title 3 would continue the government's priority, rationing and allocation powers. These are held necessary in view of shortages in some foods, industrial materials and a few manufactured items. In the later categories are tin, antimony, some housing materials, freight cars, tractors and automobiles.

Continued allocation of tin, tinplate and other tin products is necessary, Mr. Truman said, until tin supplies near normal demand. This is not expected until some time in 1948. In the case of antimony, allocations must be maintained until normal shipments from China can be resumed.

Likewise, the President said, the continued tight situation makes it necessary to continue careful allocation of freight cars and equipment and facilities in order to assure provident utilization of transportation facilities.

It is also believed necessary to continue for a time the limitation of production of automobiles and tractors for export purposes in view of the continued domestic shortages of these items.

When first adopted, the act had 14 substantive titles of which seven have either been continued in the form of permanent legislation or dropped altogether. Of the three asked to be continued, they would be abandoned as quickly as possible, the White House said.

Joint Committee Asks Extension of Premium Payments on Pig Iron

Washington

• • • **Continuation** of premium payments on merchant pig iron, without modification, to June 30 was recommended by the Joint Pig Iron Industry Advisory Committee at a meeting with CPA and Office of Housing Expediter on Jan. 31. Actually, this recommendation was said to have been "bludgeoned" out of the industry members by housing officials. Hence it was a compromise. At the outset of the meeting industry representatives asked that the premium payment program be dropped. Housing officials countered with a proposal that payments be restricted to the former closed furnaces. If this was to be done the industry expressed the opinion that the entire certification load be dumped on these producers. CPA and OHE contended that there was no relation between premium payments and certifications. The industry was turned down also for the present on a suggestion for an increase in premium payments to offset higher scrap prices.

OHE, however, did not adhere to the recommendation that the program remain unchanged and has stated that it plans to tighten up the premium payment program by increasing quotas from 80 to 90 pct. This change is being adopted, according to housing officials, because the independent producers, as distinguished from the integrated producers, accounted for only a small portion of the production increase but received the lion's share of the premium payments. Figures presented at the meeting show that merchant pig iron output increased about 48,000 tons monthly, during the period September-November 1946, with the independent producers accounting for an average increase of only 8900 tons monthly. These producers allegedly received over $1 million of the approximately $2 million dispensed in subsidies.

At the same time, OHE announced an amendment to PPR No. 8, covering production of cast iron soil pipe, eliminating premium "B" which compensated cast iron soil pipe producers who purchased their pig iron from Republic Steel Corp.'s Thomas plant at Birmingham. OPA had originally permitted that plant to charge more for their pig iron because of higher-than-normal production costs.

Cast iron soil pipe producers will still be compensated for pig iron purchased from the Thomas plant before Dec. 1, 1946 if consumed not later than Feb. 28, 1947.

Blast Furnace Capacity and Production—Net Tons

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL		Pct of Capacity	
			December	Year to Date	December	Year to Date	December	Year to Date	December	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern	12	12,988,970	737,619	8,312,717	24,684	240,630	762,303	8,553,347	69.2	65.9
Pittsburgh-Youngstown	16	25,939,940	1,494,404	17,457,567	17,589	174,363	1,511,993	17,631,930	68.8	68.0
Cleveland-Detroit	7	6,557,500	400,957	4,900,688	.....	.....	400,957	4,900,688	72.1	74.7
Chicago	7	14,093,510	899,597	9,717,193	.....	.....	899,597	9,717,193	75.3	68.9
Southern	9	4,924,670	261,615	3,180,898	6,111	108,736	267,726	3,289,634	64.1	66.8
Western	5	2,836,000	149,589	*1,285,738	.....	.....	149,589	*1,285,738	62.2	45.3
Total	37	67,340,590	3,943,781	*44,854,801	48,384	523,729	3,992,165	*45,378,530	69.9	67.4

* Adjusted.

Source: American Iron & Steel Institute

Weekly Gallup Polls . . .

Public Opposes Government Ownership of Industry

Princeton, N. J.

• • • **While countries** like England and France have been turning to government ownership of basic industries, the trend of public sentiment in the United States has been in the opposite direction, according to George Gallup, director, American Institute of Public Opinion.

Fewer Americans want to see the federal government own railroads, banks or electric power companies today than was the case a decade ago. Although slightly more would like to see the government own the coal mines than did in 1936, the number in favor still constitute a minority.

England's Labor Government has embarked on a sweeping program of nationalization of electric power, coal mines, transportation and other key industries. By contrast the American workers, including those who belong to labor unions, vote by a substantial majority in favor of continued private ownership. In fact, the viewpoint of the working man in that respect is closer to that of employers and business men than in many issues.

The two groups, who so often war over other matters, agree in their allegiance to the basic principle of private ownership.

This is shown in the latest poll by the institute in which a true cross-section of the country was asked:

"Do you think the United States government should own the following things in this country—Banks? Railroads? Coal mines? Electric power companies?"

Similar polls were conducted by the institute in 1945 and in 1936. The trend follows:

	Yes Pct	No Pct	Undec. Pct
Banks			
1936	36	56	8
1945	27	61	12
Today	26	66	8
Railroads			
1936	30	60	10
1945	19	64	17
Today	26	67	7
Coal Mines			
1936	27	64	9
1945	29	59	12
Today	33	61	6
Electric Power Companies			
1936	40	52	8
1945	29	50	21
Today	28	64	8

To show how similar the attitudes by various occupation groups and education levels are toward the matter of government ownership, the vote on the railroads in the latest poll follows in detail. The figures on coal mines, electric power companies and banks vary somewhat from those below, but not substantially. In every case, government ownership is opposed by substantial majorities throughout all occupation groups, education levels and political parties.

Government Ownership of Railroads

By Occupation	Yes Pct	No Pct	Undec. Pct
Bus. & Prof.	21	75	4
Farmers	18	71	11
White collar	27	68	5
Manual workers	30	61	9
Labor union members	32	62	6
By Education			
College	23	74	3
High School	23	72	5
Grade or No School	28	62	10
By Party			
Republicans	16	77	7
Democrats	32	61	7

The American working man may possibly be, as some people say, moving to the left but he has certainly not yet gone so far as to embrace socialist principles of nationalization.

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• • • **The great majority** of Americans are poorly informed about the amount of income tax paid by families in the upper income brackets.

The average American thinks that a man with two children who earns $10,000 a year now pays about $1000 in income taxes. Actually he pays about $1700.

As for the $50,000-a-year income bracket, the average American thinks a man with two children in that bracket pays about $9000 in taxes, whereas he actually pays around $24,000, depending upon what deductions are claimed.

Majority Unaware of High Tax Rate on Upper Income Brackets; Education in Service Favored

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Clearly many Americans, especially in the lower income levels, do not realize just how much the other and more prosperous fellow has to pay in taxes. That probably explains why the public, if it were to write the 1947 income tax law, would be very lenient in setting the rates.

When polled on the amount that a family earning $3000 with two children should be required to pay in income taxes, the public sets the rate at less than half what it is now.

The $10,000-a-year family with two children would also pay about half as much, if the public wrote the tax bill. As for the $50,000-a-year family, its tax bill would be only one third as much.

In short, the public's idea of soaking the rich is far milder than that of the Treasury Dept. or Congress.

A picture of the public's ideas on taxation was obtained by interviewing voters from coast to coast on the question:

"About how much do you think a married man with two children who earns $60.00 a week, that is $3000 a year, should pay in Federal income taxes?"

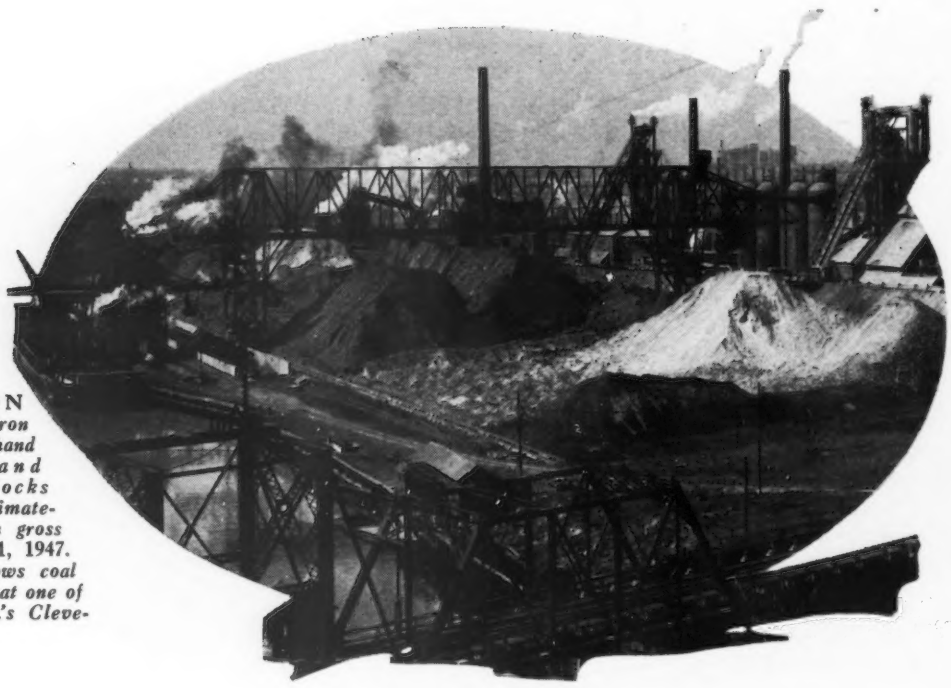
The same question was asked concerning incomes of $10,000 and $50,000.

The median average is shown below, together with estimates of the rates actually paid now. The estimates of taxes paid now were calculated with a minimum of deductions.

	What Public Thinks Tax Should Be	What Tax Is Now (Approx)
$ 3,000 Income	$ 50	$ 131
$10,000 Income	900	1,720
$50,000 Income	7,500	24,000

How ill-informed the public is

(CONTINUED ON PAGE 148)



STOCKS ON HAND: *Iron ore stocks on hand at furnaces and Lake Erie docks totaled approximately 37.5 million gross tons on Jan. 1, 1947. This view shows coal and ore stocks at one of Otis Steel Co.'s Cleveland plants.*

U. S. Agencies Closely Watch Low Grade Ore Beneficiation Plans

Washington

• • • **Steps taken by** private industry to increase research and development of beneficiation of taconite and low grade iron ores are being watched closely by the military services and other federal agencies. The cause for the government's interest lies not only in conservation but in concern over the huge inroads made during the war upon the nation's ore reserves.

Some recent estimates have placed the known available reserves of iron ore, under present conditions, at around 4.5 billion tons. Wartime depletion ran as high as 115 million tons a year. Potential reserves, largely of lower grade content, have been estimated variously from 55 to 75 billion tons.

The Bureau of Mines and the Geological Survey have set the figure somewhat higher—estimating the nation's reserves of iron ore, 50 pct or higher in content, at a total of 6.2 billion tons. One-third of this is classed as inferior ore. The potential reserves are estimated at about 70 billion tons.

Estimates of actual reserves are likely to be revised upwards

Estimates Put Ore Reserves At 4.5 Billion Tons; Potential At 55-75 Billion Tons

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since present estimates are admittedly conservative and incomplete. The probable life of the higher grade reserves will likely be extended through a reduced rate of exploitation when the demand for ore subsides to normal peacetime levels and as scrap becomes more plentiful.

Although the Lake Superior district contains only about 35 pct of the total developed ore reserves, government statistics indicate that the district has accounted for about 85 pct of the total output in recent years. At the rate of extraction carried on over the past 5 or 6 years, federal agencies put the life of high-grade deposits (50-55 pct iron ore) at about 10 years. Other estimates place it at little more, 15 and even 25 years.

On the other hand, the magnetic and nonmagnetic taconite reserves of the region are estimated by the government as running somewhere between 45 and 65 billion tons, enough to supply domestic requirements for hundreds of years. It was estimated by the National Industrial Conference Board some time ago that in order to mine taconite in a quantity equivalent to the present iron ore production in the Lake Superior district investment of at least $1 billion in beneficiation facilities would be required.

Also, sintered taconite concentrate, in terms of iron content, costs considerably more to produce. In processing magnetic taconite, the hard rock must be ground to about 150 mesh, treated by magnetic concentration, and then followed by sintering or other types of agglomeration. It would require about 2.5 tons of taconite to yield a ton of sintered concentrate containing from 60 to 65 pct iron.

Cost of producing taconite concentrate can only be estimated roughly at best, government sources say, hence the interest attendant upon the projected operations of the Oliver Iron Mining Co., and the Erie Mining Co. (See THE IRON AGE, Jan. 23, 1947, pp.

99, 106.) It is estimated by the Army-Navy Munitions Board, one of the agencies interested in the progress of these developments, that in addition to requiring larger facilities, seven times the manpower would be needed to produce a ton of concentrate from taconite than from open pit mining. The Board also estimates that it takes approximately 65 kw-hr of power to produce a ton of taconite, thus requiring extensive power development.

This greater cost of producing taconite concentrates is not likely to have too harsh an effect on the domestic iron and steel industry, from the viewpoint of the U. S. Tariff Commission in a report to Congress last year.

"Substitution of one type (taconite) of ore for the other, and hence any resulting increase in the cost of producing pig iron, are likely to be gradual, thus permitting the industry to adjust itself to the new condition," the Commission says. "It (also) appears that the greater cost of taconite concentrates is likely to be at least partly offset by decreases in other smelting costs, chiefly in fuel and overhead."

Part of the significance in the action now being taken by the two mining companies lies in the fact that they are the two largest iron mining companies, producing between them nearly 65 pct of the iron ore shipments from the Lake district. They sell only to major steel companies which must insure themselves against the time when the high-grade ores are exhausted.

Present plans call for the immediate construction of three beneficiation plants on the Mesabi range—one by Erie and two by Oliver. In addition, the Oliver Iron Mining Co. plans to build four more plants within the next 4 or 5 years and greatly expand its research facilities as well as development of underground properties. About $40 million has been set aside for these purposes.

Plans disclosed by the two companies so far contemplate further steps in the long range program, thus not only conserving natural resources but extending the life of the mining industry in the Lake region for many years.

Iron Ore Production by Selected Years

YEAR	QUANTITY (1,000 short tons)				
	Lake Superior District	Alabama	Northeastern District	All Other	Total
1929	70,364	7,227	2,459	1,741	81,791
1933	16,365	2,389	444	462	19,660
1937	69,056	7,064	3,523	1,102	80,745
1939	46,682	6,676	3,486	1,096	57,940
1940	68,847	8,194	3,987	1,511	82,539
1941	88,322	8,831	4,437	1,909	103,499
1942	101,925	9,913	3,494	2,857	118,189
1943	96,084	9,024	3,884	4,406	113,398
1944	88,605	7,649	4,311	4,847	105,412

Approximately 85 pct of the total iron ore shipments over the period given above originated in the Lake Superior district, about 9 pct from Alabama, 4 pct from the Northeastern district and 2 pct from all others. About four-fifths of the Lake Superior output is from open pit mines, chiefly in the Mesabi range of Minnesota. Table provided by the U. S. Tariff Commission from Bureau of Mines figures.

Summary of United Kingdom Steel Statistics

Source: British Iron & Steel Federation

All Figures Thousands of Net Tons	STEEL			PIG IRON	SCRAP	IRON ORE	
	Ingots and Castings	Finished Deliveries	Steel Stock (1)	Production (2)	Steelmaking Consumption	Imported Ore Consumption	Home Production
1944 Total	13599.0	11502.4	2431.5	7542.0	8252.6	2725.6	17332.2
1945 Total	13237.8	9992.3	1885.9	7959.4	8065.9	4494.7	15870.4
1945 November	1106.1	803.7	1358.0	672.0	659.9	467.7	1115.5
December	992.3	735.6	1332.4	651.8	592.7	449.7	1036.6
1946 January	1025.0	971.0	1370.9	803.6	754.8	541.5	1373.6
February	1107.5	833.2	1341.5	654.5	657.2	445.5	1147.3
March	1145.5	898.6	1314.7	659.9	695.2	484.2	1148.6
April	1129.4	827.0	1265.1	666.1	682.7	499.0	1090.8
May	1466.0	1139.0	1283.6	846.7	890.9	644.5	1371.4
June	1074.3	859.2	1266.3	678.7	640.1	531.7	1010.2
July	1012.9	791.1	1299.8	658.5	616.0	534.9	986.9
August	1265.0	968.2	1342.7	813.6	755.4	665.8	1252.1
September	1068.4	930.4	1329.2	659.9	648.7	530.4	1027.2
October	1424.1	1170.9	1236.3	872.4	860.2	707.3	1289.1
November	1181.3	933.4	1201.7	689.4	716.8	570.3	993.2

[1] Held by producers and in British Iron & Steel Corp stockyards at the beginning of the years and months shown.
[2] All qualities, including ferroalloys.

December Consumption Of Lake Ores Reflects Effect of Coal Strike

Cleveland

• • • **Consumption** of Lake Superior district iron ore by U. S. and Canadian blast furnaces in December totaled 5,516,483 gross tons, compared with 6,130,543 tons consumed in November, and 6,099,134 tons in December, 1945, according to the monthly report of the Lake Superior Iron Ore Assn.

December consumption of iron ore, 614,060 gross tons, under November consumption, reflected the coal strike and the consequent shortage of coal which forced some segments of the iron and steel industry to bank blast furnaces. When the miners went back to work Dec. 7, some additional production was lost while coal stocks were built up to the point where operations could be resumed.

Cumulative consumption of Lake Superior district iron ore in 1946 reached 62,093,056 gross tons, as compared with 74,575,878 tons in 1945.

Iron ore stocks on hand Jan. 1, at furnaces and Lake Erie docks totaled 37,464,533 gross tons compared with 41,919,189 tons on Dec. 1, and 39,058,650 tons on hand Jan. 1, 1946.

Blast furnaces depending principally on Lake Superior ore numbered 168 in the U. S. and eight in Canada on Jan. 1. With eight furnaces in blast, the Canadian steel industry had the highest operating rate since Sept. 1943. Idle furnaces numbered 17 in the U. S. and two in Canada.

Prices of Lake Superior iron ore have been increased 50¢ a gross ton, based on a number of sales which have been made by the various iron ore companies. According to sources in the trade, the increases benefit particularly underground mining operations where costs during the war were disproportionately high in relation to the fixed prices.

The last advance in iron ore prices was made last June, when OPA allowed an increase of 50¢ a gross ton in ceiling prices for iron ore produced in Minnesota, Wisconsin and Michigan. The new prices, delivered lower lake ports per gross ton (51½ pct Fe) are as follows:

Old range bessemer	$5.95
Old range non-bessemer	5.80
Mesabi bessemer	5.70
Mesabi non-bessemer	5.55
High phosphorus	5.55

Canadian Exports In November Hit Record Peak of $232 Million

Ottawa

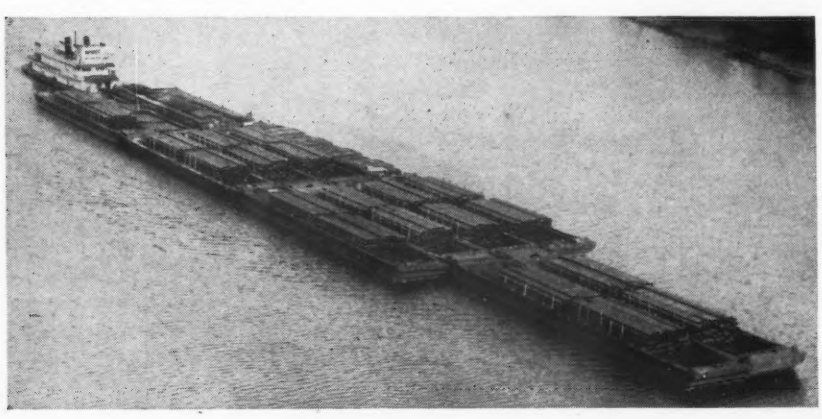
• • • **Canadian exports** in November were valued at $232,219,000, bringing the aggregate total of exports for the first 11 months of 1946 to $2,100,313,000, highest peacetime figure on record. November exports compare with $204,150,000 for October and $238,637,000 for November 1945, and represents an advance of 144 pct over the November average for the prewar years 1935-39.

November exports to the United States were valued at $89,228,000 compared with $99,086,000 in October and $101,212,000 in November 1945; the aggregate for the 11 months ended in November was $804,073,000 against $1,108,027,000 in the like period of 1945. Exports to the United Kingdom were valued at $57,885,000 against $47,665,000 in October and $52,360,000 in November 1945, while the 11 months aggregate was $538,146,000 compared with $896,840,000 in the 1945 period.

Products of iron and steel were exported in November to the value of $18,921,000 compared with $10,658,000 in October and $17,181,000 in November 1945. Automobiles and parts exported were valued at $6,661,000, which was almost twice the October valuation and approximately the same as the November 1945 figure. Both engines and boilers at $3,257,000 and farm and industrial machinery at $3,928,000 were higher than in the previous year.

Nonferrous metal products as a group were exported in November to the value of $27,468,000, a gain of about $1,300,000 over November 1945 value, but were about double the value recorded for October. There was a sharp rise in shipments abroad of aluminum to $11,803,000 from $1,852,000 in October and $7,313,000 in November 1945. Copper exports at $2,342,000 were about twice the October value but less than half the value of shipments in November 1945. Nickel exports at $4,290,000 were slightly higher than in November a year ago, but were about $400,000 under those for October.

SHADES OF MARK TWAIN: *One of the largest steel pipe shipments to move over the inland rivers since the beginning of World War II is this 9000-ton pipe shipment. The scene is on the Ohio River, with the Union Barge Line Corp.'s towboat "Neville" handling the pipe, part of an order for a southwestern Texas gas transmission line.*



Canadian Auto Output Up

Ottawa

• • • **New automobiles rolled** off Canadian assembly lines last year at the greatest rate since the last regular models were produced in 1941.

With final figures for the year available, the Bureau of Statistics reports that a total of 92,456 were turned out compared with 96,603 in 1941, 12,236 in 1942 and none in 1943 or 1944. Production in 1945 amounted to only 1868.

Output of trucks fell sharply from a record of 216,057 units for the armed forces in 1941 to 79,794 in 1946.

Warns U. S. and Canada on Depletion of Mineral Resources

Ottawa, Canada

• • • **Terming scientific research** the "greatest remaining resource of America," Dr. Clyde Williams, director of Battelle Institute and president-elect of the American Institute of Mining and Metallurgical Engineers, warned that the U. S. and Canada should view with concern the depletion of their formerly rich mineral resources.

Speaking before the Canadian Institute of Mining and Metallurgy, meeting here, Dr. Williams pointed out that the consumption of mineral resources in the last few decades, particularly during World War II, has been so enormous as to require some form of magic to insure the continued progress of civilization in the face of a diminishing supply of these resources which are "so critically essential."

"As a result of this depletion of our mineral resources, which, of course, has taken toll of most of the highest grade deposits, there has arisen for the first time a discussion of the question of whether the United States has now become a 'have not' nation," Dr. Williams said.

Citing the case of copper as being typical, Dr. Williams said that whereas "at one time only the rich, lump copper ores were smelted in shaft furnaces, as the ores became lower in grade, mechanical concentration methods were used to upgrade the materials which were recovered in the form of a finely divided concentrate smelted in reverberatory furnaces." This practice resulted in a great increase in ore reserves.

"The next step was the development of the oil flotation process, which made possible the concentration of ore containing as little as 14 lb per ton of recoverable copper, which again enlarged the ore potential. The development of heap-leaching and leach-in-place operations made available even lower grade ores and waste for conversion to copper. Similarly, the high-grade ores of lead and zinc have been largely supplanted by lower grade and complex ores that have had to be treated by increasingly difficult beneficiation and extraction processes.

Battelle Institute Head Says Only Research Can Prevent Radical Economic Changes

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"Thus, research," Dr. Williams said, "has postponed, and will continue to postpone indefinitely, the passing from the industrial picture of the parts played by the old nonferrous metals in supplying varied and valuable uses. Today, the depletion of the enormous deposits of rich iron ore that need no or little beneficiation has been so great that already processes are under development for the treatment of the lower grade ores and even the lean, unenriched iron-ore-formation materials."

The tremendous wartime production of steel, Dr. Williams declared, cut into American deposits of high-grade iron ore severely and greatly increased our dependence on lower grade ores.

"This story of the changes and the problems of the mineral industry," he said. "has a moral, which, while sobering, at the same time is cheering. We cannot fail to view the depletion of our mineral resources without apprehension. We are justified, however, in the belief that our economy need not be adversely affected if we take advantage of that newly found resource, scientific research."

"The availability of an enlarged productive capacity is a challenge that we will meet," Dr. Williams stated. "Research and development will result in the extension of the life of our minerals. It will also increase the versatility of minerals and metals in their finished forms. It will make possible the substitution of one for the other, and the use of two or more together to supplement the other's usefulness.

"The metal and mineral industry and their customers, whose present position has always depended primarily on technical excellence, will embrace technology to an increasing extent. To the degree that they do will depend largely their success in seeing that the present large capacities are made use of continuously," he pointed out.

Dr. Williams stated that there was danger to the economies of both the U. S. and Canada in any complacency that might develop because of immediate self sufficiencies of materials. Both countries are coasting smoothly at present because of wartime research developments that greatly extended their usable mineral resources, but the sleigh ride might end abruptly should these countries become satisfied with their mineral reserves and give up the quest for more usable sources of metals and other basic materials.

Dr. Clyde Williams

To Fine Can Companies

Washington

• • • **Imposition of a fine** of $5000 against each of two firms and a similar amount against each of seven officials of the American Can Co. and the Continental Can Co. has been announced here by the Dept. of Justice as the final disposition of an anti-trust case brought in the U. S. District Court at San Francisco. All defendants pleaded nolo contendere, Attorney General Tom C. Clark said.

Rolls Research Reveals Reliability Improvement For Aero Jet Engines

London

• • • **Complete fulfillment** of the prediction that gas turbine aircraft engines would become more reliable than piston engines can hardly be expected at this stage of jet engine development. Nevertheless, aero engine manufacturers are making excellent progress along these lines, according to Rolls-Royce spokesmen.

In developing the pure jet engine, for both performance and reliability, Rolls-Royce has been particularly successful, the company says. As a measure of the progress made, it is interesting to note that the first Rolls jet engine ran for only 35 hr at the modest thrust of 2000 lb, whereas today, "River Class" engines such as the Derwent V are run on development tests at thrusts varying from 2000 lb, to 3500 lb, for 100-hr.

In a recent development test, to obtain production clearance for alternative turbine blade materials, and to get running experience of the use of neat fuel, that is without the addition of lubricating oil, a Derwent V engine was run for over 100 hr. In this 100-hr period 43 hr running was done at 3000-lb thrust and 20 hr at 3500 lb, and the remaining 37 hr at thrusts varying from 3000 lb to 500 lb.

The test was planned in 20 5-hr cycles, each cycle being run nonstop, separated by long and short cooling periods for the purpose of starting trials. At the start of the test, performance curves were plotted for comparison with curves taken after the 10th and 20th cycles. These figures show that, in spite of 50 hr rigorous testing, the loss in engine performance at the end of the 10th cycle was less than 1 pct of the maximum thrust; and at the end of the 20th cycle only 1.43 pct of the maximum thrust.

The oil consumption figures were also extremely good; only neat fuel was used, and the total consumption figure for the whole test was 2.25 pints, which gave the amazingly low average of .00195 pts per hr. This figure should be compared with the true oil consumption of a jet engine, which hitherto has been of the order of 4 to 5 gal at cruising thrust, all the oil being burnt with the fuel and, therefore, not being recoverable.

If the use of neat fuel is accepted by the Air Ministry, it will not only be a useful saving in oil consumption, but also a saving in time and manpower when refueling jet-propelled aircraft, the company stated.

During this particular test run, exhaustive starting trials were also made which consisted mainly of hot and cold starts to test the response of the engine at the extreme conditions. A hot start is defined as a start made within 15 min of shut-down and a cold start as one made at least 2 hr after shut-down. Over 100 starts were made, and only one false start was recorded.

Included in Rolls-Royce jet engine test schedules is an overspeed test to prove that the safety factor of the turbine wheel is unimpaired after prolonged periods of running. For this test the engine rpm is increased 3 pct above the standard combat rpm, the actual speed being 15,150 rpm. This results in a rise in jet pipe temperature to 706° C, that is 26° C above the permissible maximum for service operation; the combination of increased rpm and temperature thereby aggravating the centrifugal and thermal stresses to loads which will never be encountered in service.

Four of these overspeed tests were completed on the test run, and the engine showed no signs of distress. A Rotol auxiliary gear box carrying a Dowty pump, Pesco vacuum pump, and a Rotax generator were driven by the engine throughout the test and all the units functioned satisfactorily.

This rigorous testing of a Derwent V engine is not in any way unusual, but is typical, the company reports, of the Rolls-Royce development work which is continually going on.

Coming Events

Feb. 13-14 First National Ordnance Gage Conference, Lehigh University, Bethlehem, Pa.
Feb. 17 Chicago World Trade Conference, Chicago.
Feb. 18-20 Magnesium Exhibition, Wright Field, Dayton, Ohio.
Feb. 20-22 American Foundrymen's Assn., congress and exposition, Birmingham.
Mar. 2-5 American Society of Mechanical Engineers, spring meeting, Tulsa, Okla.
Mar. 6-8 National Assn. of Foremen, annual national conference of educational directors in industry, Cleveland.
Mar. 17 American Institute of Mining & Metallurgical Engineers, world conference on mineral resources, New York.
Mar. 17-19 American Society of Lubrication Engineers, annual meeting, Pittsburgh.
Mar. 17-19 American Gas Assn., sales conference, Boston.
Mar. 17-19 Chicago Technical Societies Council, production conference, Chicago.
Mar. 19-22 American Society of Tool Engineers, annual meeting, Houston.
Mar. 22 Western Metal Conference and Exposition, American Society for Metals, Oakland, Calif.
Mar. 24-25 American Machine Tool Distributors' Assn., spring meeting, Chicago.
Mar. 31-Apr. 2 Midwest Power Conference, Chicago.
Apr. 7 Packaging Machinery Manufacturers Institute, semiannual meeting, Philadelphia.
Apr. 7-10 National Assn. of Corrosion Engineers, convention, Chicago.
Apr. 8-11 American Management Assn., packaging exposition, Philadelphia.
Apr. 14-16 National Machine Tool Builders' Assn., spring meeting, Atlantic City, N. J.
Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition, Industrial Packaging Engineers Assn. of America, Chicago.
May 6-10 Society of the Plastics Industry, Inc., exposition, Chicago.
May 15-17 Society for Experimental Stress Analysis, annual meeting, Chicago.
June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.
June 17-19 Machinery Dealers National Assn., convention, Cincinnati.

The London ECONOMIST

Army-Navy Merger

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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THE announcement that the Army and Navy have arrived at a compromise unification plan satisfactory to both services as well as delightful to President Truman would be more pleasing to the rest of the country if there were more evidence that it were true; and if there were not quite so much evidence that the basis of the struggle has merely been transferred from principles to details, its locale from the public prints to the whispering corridors of Washington.

The plan itself bears a sufficiently striking resemblance to those adopted on several occasions during the war, when it became necessary to reconcile the objectives of irreconcilable agencies, whose areas of authority overlapped—the plan of leaving both agencies intact, but setting up a third, superagency embracing both the others. The notable case at that time was the creation of the Office of War Information, which was to be a policy-making body in the field of public information, but which turned out to be an executive institution for policies determined everywhere else; and policies often mutually contradictory.

The new plan for the armed services does not promise much better. One of the Navy's leading objections to previous plans was that it was deprived of a voice in the Cabinet. The Army Air Force's chief desire was to obtain such a voice; and that of the Army General Staff was to have a Cabinet officer, who should be above all the services.

On this plane, the new plan provides for giving everything to everybody, so that the United States will have not a single Secretary for all the armed services, but four such officers—one for each of the three services, with the new Secretary of National Defense as arbiter. It will be interesting to see who draws this extraordinary assignment, which would seem to call for the combination of Talleyrand and King Solomon—if the plan goes through.

Under it the Army and Navy are to retain their own tactical air forces, while the Air Force operates in the strategic domain. But who decides where the boundaries of this domain lie? The new Secretary, his staff, or the Army's General Staff, which apparently wishes to be a Great General Staff on the German model? The Secretary of National Defense is to be the judge, and he is to be a civilian, that is, a man fundamentally ignorant of the subject on which he is arbitrating.

It is hard to see in this part of the proposal anything but a victory for the most extreme Army point of view, and in this sense, it is no surprise that the proposal should be delightful to Mr. Truman, the ex-artilleryman, who seldom saw water in anything larger than a bathtub before he became President.

BUT the whole thing is at present merely a proposal, an agreement, whose very approval by the President is not unlikely to make it unpalatable to a Congress acting on the principle that it is sound politics to answer No to any request that Harry Truman makes. Only the Congress can establish the necessary two new Cabinet posts; or alternatively disestablish the present Secretaries of War and Navy in favor of a new single Secretary for National Defense.

Congress—at least the controlling sections of Congress, which are the new Armed Forces Committee of House and Senate—evidently wants nothing to do with the matter at present. The Senate Committee is mute; Mr. Andrews, the Chairman of that Committee in the House of Representatives, issues a statement which presents an excellent imitation of a man holding a hot potato and looking for a place to put it down. Any bills on the subject of unification (which he prefers to call integration, apparently failing to realize that it is the stronger word) will be routed, he says, not through his committee but through the rather obscure committee on Expenditures in the Executive Department. The reason is, once again, that this committee would be a disinterested umpire—that is, it would be ignorant of what it was dealing with.

The remainder of Mr. Andrew's statement, which footnotes and underlines all the hearts and flowers in the official announcement, demonstrates how real the conflict between the services still is, and why he is so anxious to drop the potato. He proposes that Truman shall gag Army officers with regard to unification, as he has already forbidden Navy officers from speaking on the subject.

The idea may be dismissed as Republican party politics, but it is, beyond this, evidently a bow in the direction of the Navy. Few Navy officers have been able to avoid the opinion that the reason they were put to silence was that the arguments against the unification proposals they advanced were unanswerable.

Mr. Andrews proceeds to say that there is no real difference in the viewpoints of the two services, and this is a bow to the Army. There is a very real difference; the question is fundamentally the adoption or nonadoption of the ideas of the Army General Staff, which believes that it should make all large decisions in war, which believes in universal conscription, which believes that there should be no such *corps d'èlite* as the Marines, sustained by voluntary enlistment, while the ordinary citizen has no choice of the branch in which he will serve. Either the Army will attain the objective of making the branch of service a matter of direction from higher authority or it will not; but this is the question both Mr. Andrews and the merger plan that so pleases Truman carefully avoid.

(CONTINUED ON PAGE 152)

Announces Transfer of War Surplus to France Almost Complete

Paris

• • • **The transfer to French authorities of United States war surplus located in France with an estimated original cost to the United States of $1,398 million is now substantially complete, Maj. Gen. C. L. Hyssong, Acting Central Field Commissioner for Europe, Office of the Foreign Liquidation Commissioner, announced recently. Only three depot sub-sections, which are located in the Paris and Rheims areas, and several smaller installations still in use by the Army's close-out force still remain to be transferred.**

The surplus stocks are being transferred to France under provisions of the Blum-Byrnes agreement signed in Washington last May. The agreement provided for a loan to France of $1,370 million of which $300 million was earmarked to cover the purchase of the war surplus goods. According to A. Eric Taff, OFLC's Field Commissioner for France, under whose direction the transfer plan was drawn up, 272 former Army supply depots and installations of all types, strung across France from the northern and southern invasion ports, have been handed over to the French authorities.

The surplus materials now being acquired by the French Government will provide quantities of items which have been in short supply in France, expected to be a substantial factor in the Monnet reconstruction and modernization program.

Transferred under Agreement Stocks Originally Cost U.S. $1,398 Million

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Included in the stockpiles of equipment and supplies transferred to the French Government are the surplus materials in 20 ordnance depots, 10 engineer depots, the three large quartermaster depots at Le Havre, Reims and Marseille with their 51 sub-depots, three signal depots, the modern medical equipment installed by the Army in 19 hospitals, the port facilities and improvements at Cherbourg, Le Havre and Marseille, 26 airfields and Army Air Force installations, 11 redeployment camps and other tent cities, POW enclosures, machine shops, communications systems, pipelines, filling stations, railway and highway bridges, and Army-installed machine tools and equipment in various factories.

In the transportation field alone France has received from surplus more than 120,000 vehicles of all types together with spare parts and repair shops. Engineer depot stocks, with an estimated original cost of $347 million have yielded important quantities of heavy construction equipment including cranes, power shovels, compressors, excavators, concrete and road graders. Ordnance supplies transferred originally cost the United States $685 million and quartermaster supplies and installations turned over are estimated to have cost $207 million.

One of the most valuable single installations is the rebuilt Port of Cherbourg whose cargo capacity was multiplied during the war by $15 million worth of U. S. Army construction. Equipment at Cherbourg, which went to the French under the war surplus transfer, included such items as diesel-electric floating cranes, portal wharf cranes, stiff-legged derricks, crawler cranes, coal-handling buckets, patrol boats and fire boats, some 200 cargo barges, a floating pile driver, a floating dry dock, new wharfage and a quarter of a million dollars worth of stevedoring equipment.

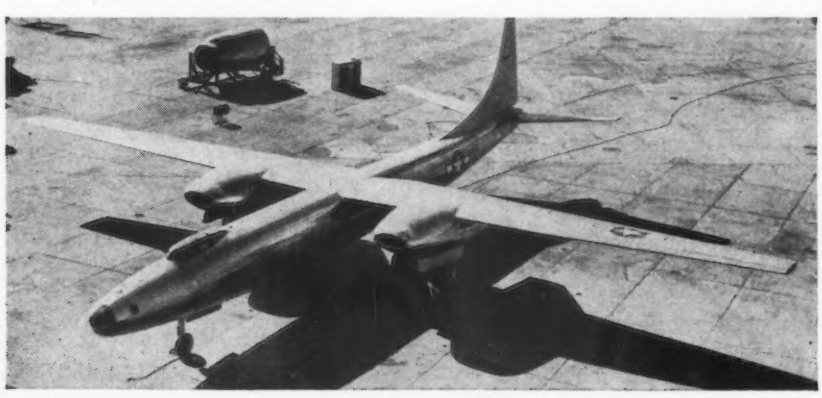
Under the transfer plan worked out jointly by OFLC, the Army, and the Conseil Francais des Surplus Allies, the turnover of surplus stocks in France has been progressing steadily since last August. In order to effect the physical transfer of properties with as little delay as possible, the plan provided for French authorities to make an advance survey of all installations prior to the scheduled turnover date to estimate their operating and security personnel requirements.

To avoid drawn-out inventory verifications, the agreement also provided for a joint French-American spot check of 2 pct of the line items in the depots on which to base shortages or overages of the total inventories. Under this procedure transfers were completed in most instances within 10 days after the French "take over" crews arrived at the depots.

Actual transfer of the surplus stocks to the French has constituted the principal single mission of the Army Western Base Section in France. With this task practically complete the Army's gradual withdrawal of remaining troops in France will be accelerated.

Distribution of the surplus stocks into France's economy is being handled by the official government agency, the Societe Nationale de Vente des Surplus. While sales of large portions of the stocks have been under way for some time, officials of the organization have pointed out that their task probably will require months.

QUADJET: *In this first official view of the Army's new XB-46, the wraps are removed from a new 4-engined bomber which has been under construction for 2 years in Consolidated Vultee's San Diego plant. It is powered by four GE turbojet engines in two nacelles.*



R. R. Diesel Program Draws Coal Union Fire

Pittsburgh

• • • **Announcement by the Pennsylvania** R.R. that it would acquire 25 new diesel locomotives was met here with a union statement that the road's replacement of steam with diesel power would be fought in the state legislature. Michael Honus, secretary-treasurer of United Mine Workers district 4 at Uniontown, declared that the miners in that area would fight in the legislature the program to replace coal burners with the new diesel type engines. John P. Busarella, president of UMW district 5 at Pittsburgh, said that every steam engine driven off the line means 22 miners out of a job.

The Pennsylvania, like all railroads, is looking to its own pocketbook, and is ordering the newer type equipment for economic reasons alone, it was said here. Higher coal prices coupled with curtailed operations during coal strikes have been major factors in forcing the Pennsylvania to turn to diesel equipment. Further, extensive use of such equipment over the past several years has proved its economic value. The new order for 25 diesels by the Pennsylvania brings to 47 the number of the smokeless type locomotives on order for the line. Within the next month, 12 of those previously ordered will be put into service; and 10 others will be ready by June. The most recent order is for delivery late this year.

Despite the fact that the UMW has gone on record to fight in the legislature the use of diesel equipment, there is likely to be no change in the railroad's trend toward diesel-electric power. The fight of the UMW for steadily higher pay has been constantly increasing the price of locomotive coal. One source points out that the price of this coal has increased 51 pct in the past 5 years, whereas diesel fuel has increased only 24 pct. With 20 pct of the coal used in the United States going to railroads, the effect of a complete conversion to diesel is quite apparent. Currently there are on order in the United States about seven times as many diesel type locomotives as there are steam units.

Legislative Fight Against New Locomotives Threatened By UMW District 4

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The new Pennsylvania equipment will be used in through service between St. Louis, Chicago and Harrisburg, via Pittsburgh. The passenger locomotives will each have three 2000-hp units while the freight engines will each have five 1500-hp units. The new orders were placed with: General Motors Corp., 6 freight and 5 passenger units; Baldwin Locomotive Works, 9 passenger engines; and American Locomotive Co., 5 passenger locomotives.

Lauds Labor's Record

Fort Wayne, Ind.

• • • **J. L. McCaffrey,** president of International Harvester Co., last week told newsmen who had gathered here to preview the company's new line in celebration of its 40th year in the truck field:

"I want to commend to you our labor force which today set a plant production record of 180 trucks. We are proud of our men and women workers and believe that all of the nation's industrial relations problems today are the result of improper relations years ago. We were not human to each other."

Approximately 300 news men from all parts of the country were shown the 1947 IHC trucks in contrast to the first "auto-wagon" of 1907, and 1917 and 1927 models. A plant tour and visit to the company's proving grounds, where reporters and editors put the trucks through their paces, were included in the day's program.

Okays Urgency Certificates

Washington

• • • **Outstanding** CPA urgency certificates may now be used to buy government-owned surplus when the public offering so states. This, CPA explains, would apply in the field of construction machinery, for instance. Although CPA ceased issuing urgency certificates with the revocation of Dir. 16 to PR-13, those which have been issued remain valid.

VICTORY NO. 50: *One of Russia's new heavy freight engines, the "Victory" model, emerges from the shops at Koloma City, in the Moscow area. It is the fiftieth built at the Kuibyshev plant in the 50 mph "Victory" series.*

Industrial Briefs...

• NEW STRIP MILL — Weirton Steel Co.'s new 66-in. hot strip mill rolled its first steel on Jan. 29. The mill is a 4-high continuous mill which rolls out thick slabs of steel into long coils of thin-gage metal that is made into tinplate or steel sheets of various kinds. The new mill is expected to produce at least 135,000 tons of hot-rolled strip per month, an increase of approximately 50 pct over the average production of the 48-in. mill.

• PLANT ADDITION—Burroughs Adding Machine Co. of Detroit has authorized an addition to the main plant in order to provide additional productive capacity.

• BUYS ASSETS — Ex-Cell-O Corp., Detroit, has purchased the assets of Electro-Pure Pasteurizer Div. from the Trumbull Electric Mfg. Co., Plainville, Conn., a subsidiary of General Electric Co.

• ACTIVITIES CONTINUED — It has been announced that the research organization and activities of Tainton Products Ltd. will be continued under the ownership of the Freeport Sulphur Co. and will be known as Tainton Products Co., Baltimore.

• SAE BOARD CHAIRMAN — A. T. Colwell, of Cleveland, has been appointed as 1947 chairman of the technical board of the Society of Automotive Engineers. Mr. Colwell, who is past-president of SAE and vice-president of Thompson Products, succeeds J. M. Crawford, of General Motors Corp.

• BUYS AIRCRAFT PLANT—Electric Boat Co. of New York has taken over the plant at Cartierville near Montreal formerly operated by Canadair Ltd. It is understood that the transaction is on the basis of a lease agreement. In acquiring the plant, Electric Boat is making its first entry into the aircraft industry and it will continue the production of the "North Star" transport.

• BUYS FURNACE LINE—Rheem Mfg. Co. is purchasing from Fraser Furnace Co. its entire gas furnace and appliance business, including patents, designs, trade name, inventories and certain manufacturing equipment.

• TEXAS PLASTICS — Monsanto Chemical Co. has announced the formation of a Texas division with headquarters at Texas City for the production of polystyrene plastics to be started in the near future. The 50,000 tons capacity styrene plant at Texas City, which the company purchased from WAA in August 1946, will form the nucleus for the new manufacturing division.

• PIPE FIRM SUES — Charging that a 1-week strike in July 1945, and an 8-week strike a year later caused the company great monetary loss and injured the firm's reputation with its customers, Stockham Pipe Fittings Co., Birmingham, filed suit for $750,000 against the United Steelworkers of America, CIO, in circuit court here Jan. 24. The action followed a portal-to-portal pay suit against the company for $500,000 which the union filed in Federal Court in December 1946.

• SELLS STOCK INTEREST—The Forest Park Home Foundation and W. H. Sommer have contracted to sell 183,902 shares of stock of the Keystone Steel & Wire Co. to the Keystone Steel & Wire Co. and its subsidiary, National Lock Co. of Rockford, Ill. The total cash consideration to be paid is $7,356,080, it is reported.

• NEW INSTRUMENT FIRM—The Middlebury Electric Clock Co., formerly at Chicago, has been reorganized as the Middlebury-Carson Mfg. Co. and has leased factory space at Stevens Point, Wis. to make temperature control instruments.

Conducts Experiment To Produce Coal Gas By Bombing a Coal Mine

Birmingham

• • • A specially prepared coal mine on the Alabama Power Co.'s Gorgas properties, 60 miles north of Birmingham, was set ablaze by three thermite bombs Jan. 21—objective, to produce coal gas from a fired mine by blowing a controlled stream of air through it.

The experiment, first of its kind in the United States, was carried out on a small oval hill where an outcropping of the Pratt seam, too thin to be mined commercially, was isolated by the effective method of cutting through the ridge down to the depth of the seam.

As Bureau of Mines engineers and chemists, and others, including Dr. W. C. Schroeder, director of the Office of Synthetic Liquid Fuels, Washington, looked on, Milton Fies, manager of mining operations for the power company, and Arthur Sands, Bureau of Mines chemist, pulled the fuses of the bombs and dropped them into the mine.

The incendiaries landed on a prepared bed of loose coal—some 800 tons of it—placed against the working face.

Within a few minutes Mr. Fies announced, "She's burning." And observers flocked to specially prepared peep-holes of heavy glass through which the action in the mine could be watched.

Less than 10 min after the original firing, thermocouple readings from the blazing section of the mine showed a temperature of 1700°F. After 24 hr the fire had developed temperatures in excess of 2000°.

Mr. Fies and Bureau of Mines chemists, after several days of tests, were still wary of making definite predictions. They agreed, however, that first phases of the experiment were "entirely satisfactory."

Thus far, the richest gas mixture produced has heating properties at about 250 Btu per cu ft, but sponsors of the project emphasize that weeks, perhaps months, of research work will be necessary before the full possibilities of the experiment are known.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

2600 Tons, McCook, Ill., diesel plant building for Electro Motive Div. of General Motors Corp. to American Bridge Co., Pittsburgh.

1000 Tons, Denver, power house, Public Service Co. of Colorado to Midwest Steel & Iron Co., Denver.

495 Tons, Urbana, Ill., building for University of Illinois to Duffin Iron Co., Chicago.

395 Tons, Pasadena, Tex., building for Ebasco Services to Virginia Bridge Co., Roanoke, Va.

125 Tons, Omaha, Neb., warehouse for Massey Harris Co. to Gate City Iron Works, Omaha.

125 Tons, Devils Slide, Utah, conveyor gallery to Kansas City Structural Steel Co., Kansas City, Kan.

• • • Fabricated steel inquiries this week included the following:

5500 Tons, Midland, Pa., hot and cold strip mill building for Crucible Steel Co. of America, New York.

4000 Tons, Norristown, Pa., Philadelphia Electric Co., Barbadoes Island Station, power plant, due Feb. 17.

2200 Tons, Lexington, Ky., building for the University of Kentucky.

2000 Tons, Passaic, N. J., Route S-3 over Passaic River, bridge, New Jersey Dept. of Highways, due Feb. 13.

1280 Tons, Newark, N. J., Route 25-A, bridge over Passaic River, New Jersey Dept. of Highways, due Feb. 24.

800 Tons, Monroe County, N. Y., bridge.

575 Tons, Clifton, N. J., Route S-3, section 4-A, bridge over Delaware, Lackawanna & Western R.R., New Jersey Dept. of Highways, due Feb. 17.

400 Tons, Fayette County, Ill., bridge section W 2V-F for State of Illinois.

250 Tons, Sioux City, Iowa, bakery building.

205 Tons, Cambria County, Pa., bridge, Pennsylvania Dept. of Highways, due Feb. 21.

200 Tons, Newark, N. J., material for construction of machinery for bridge over Passaic River, Route 25-A, New Jersey Dept. of Highways, due Feb. 13.

160 Tons, Placer Co., Calif., underpass and widening of bridge between Wise Canal and Rock Creek, California Div. of Highways, Sacramento, bids to Feb. 26.

120 Tons, Cambria County, Pa., bridge, Pennsylvania Dept. of Highways, due Mar. 3.

105 Tons, Crawford County, Pa., bridge, Pennsylvania Dept. of Highways, due Mar. 3.

105 Tons, Lackawanna County, Pa., bridge, Pennsylvania Dept. of Highways, due Feb. 21.

105 Tons, Exeter, Calif., bridge at Yokol Creek, California Div. of Highways, Sacramento, bids to Feb. 26.

100 Tons, York County, Pa., bridge, Pennsylvania Dept. of Highways, due Mar. 3.

• • • Reinforcing bar inquiries this week included the following:

600 Tons, Westley, Calif., bars for Delta-Mendota Canal and Westley Wasteway, Bureau of Reclamation, Denver, Inv. E33,071-A, bids to Feb. 6.

510 Tons, Kingman, Ariz., bars for Davis Dam Project, Bureau of Reclamation, Denver, Inv. 7461-A, bids to Feb. 5.

270 Tons, Urbana, Ill., mechanical engineering building, University of Illinois.

215 Tons, Newark, N. J., bridge over Passaic River, Route 25-A, New Jersey Dept. of Highways, due Feb. 13.

120 Tons, Santa Fe, N. M., bridge, San Juan Co., State Highway Engineer, Skousen Construction Co., general contractor.

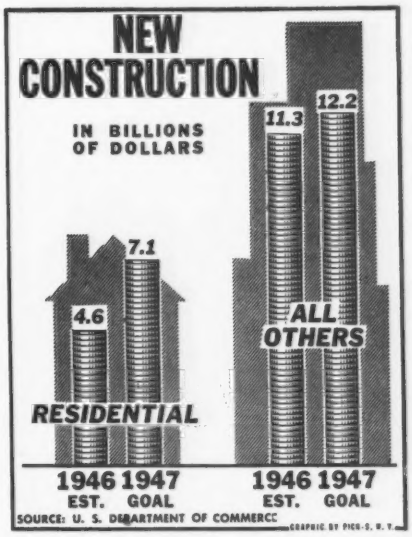
115 Tons, Napa, Calif., two bridges (I-Nap, Lak-49-A,A), California Div. of Highways, Sacramento, bids to Feb. 26.

• • • Sheet piling inquiries this week included the following:

3600 Tons, Chicago, Northerly Island airport, city of Chicago.

• • • Railroad car awards this week included the following:

Kansas City & Southern R.R. has ordered 800 50-ton 40 ft 6 in. box cars from Pullman Standard Car Mfg. Co. Nashville Chattanooga & St. Louis R.R. has ordered 200 50-ton gondolas from Pullman Standard Car Mfg. Co., Butler, Pa. Chesapeake & Ohio R.R. has ordered 1000 70-ton hopper cars from General American Transportation Co. at East Chicago, Ind. The Louisville & Nashville R.R. has ordered 1200 hopper cars from American Car & Foundry in St. Louis and 200 ballast cars from the same producer at Madison. The Denver, Rio Grande & Western has ordered 500 60-ton box cars from the Pressed Steel Tank Car Co. and the B&O has ordered 500 hopper cars from the same company. Pennsylvania R.R. has placed orders for 25 diesel electric locomotives for delivery in late '47 and early '48. Electro Motive Div. of General Motors Corp. received six locomotives, Baldwin Locomotive received nine and American Locomotive was given an order for five.



Last Quarter Disposal Reached $225 Million

Washington

• • • With about 85 pct of declared foreign surpluses having been liquidated, disposals for the fourth quarter of 1946 amounted to $225 million (acquisition cost) for which a return of $95 million was realized, the State Dept. reported to Congress recently. Disposals for the quarter slightly exceeded declarations, the report showed.

Through Dec. 31, it was reported, $8.8 billion worth of property overseas had been declared surplus. Of this amount, $6.8 billion had been disposed of and it was estimated that there still remains approximately $2 billion to be declared.

Photographic Reproduction

(CONTINUED FROM PAGE 63)

withstand the most severe forming operations. It is inert as far as the emulsion and processing chemicals are concerned. It can be quickly and easily removed by chemical means when necessary. With this solution as a base, the sensitized emulsion can be placed upon steel, aluminum, Masonite, wood, magnesium, plastic and virtually any other material.

There are a few precautions to take in treating various materials with the substratum solution and sensitized emulsion prior to using the material in an actual prototype. Magnesium material must be completely sealed on the back face and edges with a good sealer such as clear lacquer before processing. Otherwise it will react chemically with the hypo and other processing solutions. It is not necessary to seal the face of the sheet which is covered by the bonding and sensitized solution. Magnesium should be processed in the minimum time to insure its freedom from detrimental reactions.

Most other metals such as aluminum and steel alloys are simple to process. If the presence of welded areas produces any undesirable reactions with the processing solutions, those areas may be covered with a sealing lacquer. Wood should be painted with a filler such as Dupont Preparakote to fill in the pores and cracks. The backs and edges of wooden panels should also be sealed to prevent warping. This is especially important in the use of plywood.

Plastics have been particularly difficult to handle because their smooth surface does not present a good bonding area. However, the Ryan substratum solution works very well with all plastics including Vinylite.

It is advisable to avoid the extreme heating of material upon which drawings have been reproduced because the emulsion may become cooked and the primer may tend to come off. About the only fabricating process in which this problem may arise is in the sawing of metal parts.

MACHINE TOOLS

. . . News and Market Activities

Plans Under Way to Form Strategic Reserve of Machine Tools

• • • **Preliminary** steps toward formation of a strategic reserve of machine tools are being taken by the authorities in Washington, where it finally became apparent that the nation's war potential in machine tools was being rapidly dissipated and that something should be done about it.

Size of the potential reserve is still something of an enigma, with estimates ranging from 75,000 to 100,000 tools. Reliable sources indicate that the lower figure is probably closer to the truth, but with the Army Air Forces requirement set tentatively at 40,000 machines, a reserve of 100,000 units is not an impossibility.

JANMAT, the joint Army-Navy machine tool group, has been making a survey of members of the National Machine Tool Builders Assn., asking which machines each builder built during the war should be set aside. This will be followed up, according to reports, by seven teams which will go out into seven of the machine tool districts, St. Louis, Philadelphia, New York, Detroit, Cleveland and Chicago, sometime this month and begin setting the tools aside.

According to some observers, the Navy Bureau of Aeronautics will tie in with AAF on the 40,000 tool requirement, leaving about 35,000 tools for the Ordnance Dept. and miscellaneous services. It is reported that the Navy has no requirements, over and above the equipment it purchased with its own funds in setting up war contractors. These tools the Navy will retain apparently.

John R. Steelman, OWMR director, acting on the recommendation of the War and Navy Depts., last November authorized the earmarking of such tools as the services might need. The number of machines the services have assigned to themselves with the cooperation of War Assets Administration since that time is debatable, but only those machines on the short supply list were placed beyond the services' reach. In any event, the reserve in theory at least will be sufficiently large to fill the gap temporarily until the machine tool industry can get under way again in the event of another national emergency. The Manhattan project has already earmarked some.

Another Peak Period for WAA Anticipated with Industry Suffering Worst Blow

o o o

As a parallel to development of a machine tool reserve, some of the authorities in Washington are quite concerned over the effect of the sale of surplus on the machine tool industry, according to reports. WAA is currently selling about twice as much as the industry in terms of original acquisition cost compared with the cost of new machines. Adding many machines to the cut-price list helped WAA's sales out and with another addition to the list reportedly on the way, all but 10 pct of the government-owned surplus machines will be available at cut prices.

This will probably mean another peak period for WAA and to some extent a corresponding slack period for the industry, which in the next 2 or 3 months will feel the effect of the surplus like never before, according to sources in the trade.

At the same time, some contractors who have had machines on lease from RFC these many months have been having some difficulty in getting the cut-price from RFC when they have tried to buy. Present prices make machines which have been in possession of the lessee only a particularly good buy.

WAA's present machine tool inventory is estimated to be $1 billion, the bulk of which is concentrated in Cleveland, New York, Chicago, Detroit, Philadelphia and Cincinnati. Present expectations are to close out all machine tools by the end of 1948, which most observers consider quite an ambitious undertaking.

In Detroit the trend of machine tool volume is mixed with standard tool sales continuing to lag in the face of losses to surplus while inquiries and orders for special equipment remain at existing levels. Some sources are enjoying a substantial volume of foreign sales and report backlogs that will carry well along into 1947.

Improved delivery schedules on medium electric motors has eased that problem somewhat, although fractional horsepower motors remain in tight supply.

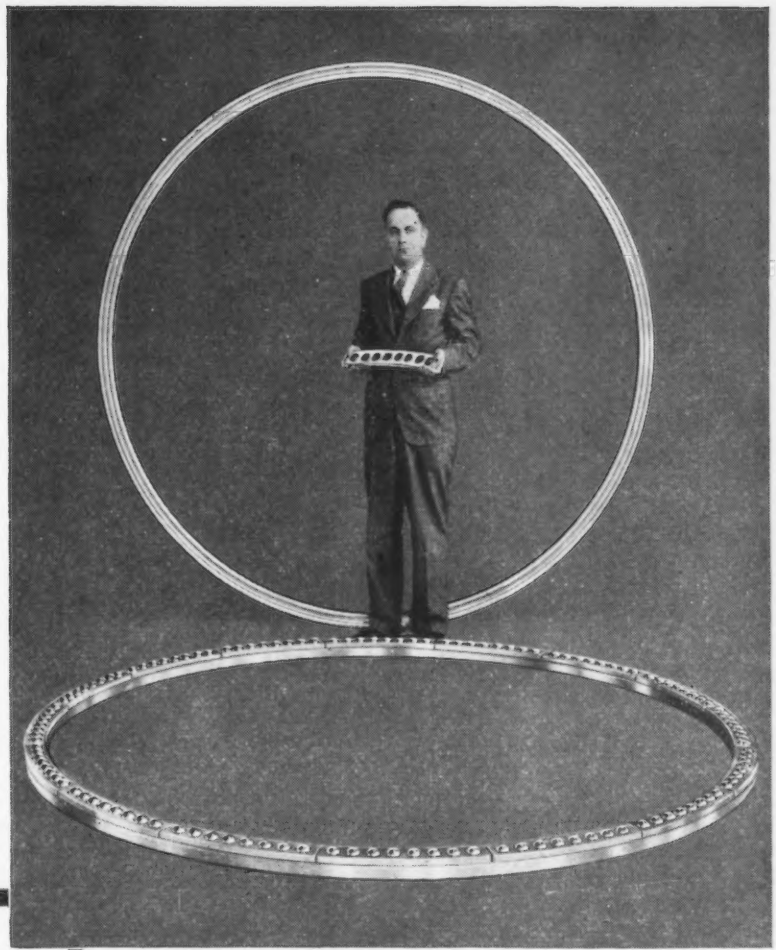
Cincinnati sources indicate that business is much the same as it has been for the past several weeks, with orders coming in dribbles. Foreign business consumes about 25 pct of the output, but the orders coming from foreign countries are spotty. The original buyers, Norway, France, Belgium, Holland, and some of the other European countries, are held up now by lack of financial appropriations, while Turkey and Russia and Czechoslovakia take the lead in buying. The larger tools are, of course, in smaller demand, but it is reported that one small tool builder recently sold $500,000 worth of lathes to Turkey.

In Boston and the East, manufacturers with personal representatives in the field report export business expanding, although slowly. Others are establishing agencies as rapidly as possible. Tool makers are giving considerable consideration to South America, English and some European prospects. South America is especially interested in plastic-working equipment. Elsewhere buyers want standard up to the minute metalworking tools.

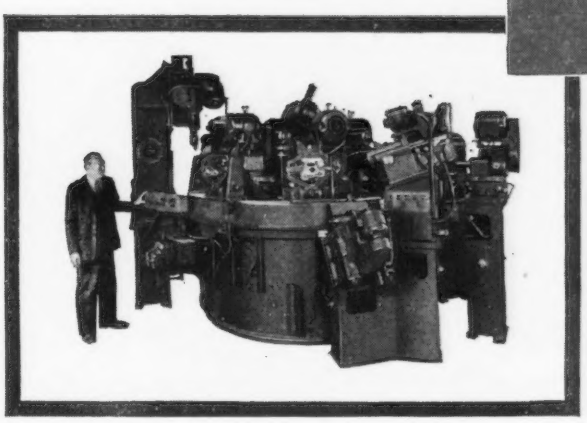
O. K. KAYDON BEARINGS

for

Leeromatic Precision Production Machines



KAYDON Ball Thrust Bearing, 81.996" x 87.000" x 3.750", used in "Leeromatic Six" and "Leeromatic Eight" automatic precision drilling machines manufactured by Lee Engineering Company, production engineers, Detroit.



The "Leeromatic Eight" is an 8-station automatic precision machine to drill, bore, mill and perform various other operations on a water pump body at a single set up, holding a limit of .0005" on diameter of pump shaft hole, and insuring proper relation of the various holes. When part is unloaded it is machined completely, ready for assembly. A similar 6-station machine, the "Leeromatic Six", produces 285 completely drilled automobile differential carriers per hour. KAYDON *Bearings insure true running, accurate index tables which make these .0005" precision operations possible.*

President C. S. Lee, of Lee Engineering Company, Detroit, wrote us: "... The KAYDON Bearing is the only bearing which gives us the required concentricity and load capacity giving accuracy of .0005" limit on the part produced, making possible the success of this type of machine."

Designers of modern machinery, striving to apply technological advances of the past several years to gain greater production, generally find KAYDON Bearings an important aid in attaining their objectives.

Counsel in confidence with KAYDON. Capacity available for all sizes and types of KAYDON Bearings ... and for atmospheric controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services.

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

NONFERROUS METALS

... News and Market Activities

Custom Copper Smelters Post a 1¢ Price Rise

• • • **Since the increase** of 1¢ per lb in the price of copper announced by the American Smelting and Refining Co. on Jan. 27 and followed by the American Metal Co., no other producers have followed up with similar price announcements. Therefore the present market must be quoted with a spread from 19.50¢ to 20.50¢ per lb. The custom smelters were forced to increase the copper price because of the climbing market in copper scrap.

Copper producers are reluctant to see the price of copper go higher and are making every effort to prevent further rises. For that reason they have not so far found it necessary to follow the lead of the custom smelters. However, it is recalled that when copper was selling at a price of 17.50¢ per lb, producers were attempting to stabilize the market at that figure. When fabricators were buying more copper at the E & MJ weighted average (Metals Reserve sales) than was being bought at the producers prices it became necessary to follow suit and raise prices. It is possible that producers will be forced once again to raise the price.

Market observers who are speculating on prospective price developments in copper are eyeing the foreign copper market where export copper f.a.s. New York is quoted at 20.00¢ to 20.25¢ per lb. It is generally agreed that such prices must necessarily exert pressure on domestic prices to bring them to higher levels.

Most buyers of copper would far rather buy from custom smelters at a 1¢ per lb premium than have to buy foreign copper for future delivery and be required to pay the 4¢ duty. However it is true that fabricators of imported copper can recapture the duty paid if the fabricated products are exported within two years.

•

Lead

• • • **The lead market** continued in short supply and dependent on the allocation of some lead by OMR for February delivery. It is understood that there will be a February allocation but it is expected to be less than the tonnage made available in January. Shipments of lead are reported to have been retarded recently by the domestic freight car shortage and by the Mexican freight car shortage which has cut down the movement of ore and concentrates to smelters. Some factors in the market predict that by March there will be plenty of lead to take care of all essential domestic requirements for applications such as batteries, lead covered cable, paint, etc. This development is credited to the release of lead imports from government control. Prices of lead hold firm at previous quotations.

•

Canadian Finished Prices Follow Rise in Ceilings

Toronto

• • • **Anaconda American** Brass Ltd., has announced an increase in prices of fabricated products equal to the recent increase in the ceiling price of copper, lead and zinc. Speaking of the price increase which went into effect Feb. 1, J. S. Vanderploeg, general manager, stated:

"We are purchasers of Canadian refined copper, lead, zinc, etc., which were recently increased approximately 5¢ per lb. From these metals we fabricate copper, brass, bronze, nickel silver, etc., in the form of sheets, rods, tubes, extruded shapes and heavy wire. We are advancing the prices on our products, effective Feb. 1, to match the increase in raw materials.

•

Monthly Average Prices

• • • **The average prices of the major nonferrous metals in January, based on quotations appearing in** THE IRON AGE, **were as follows:**

	Cents Per Pound
Electrolytic copper, Conn. Valley	19.546
Lake copper, Conn. Valley	19.625
Straits tin, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Lead, St. Louis	12.717
Lead, New York	12.907

Brass Union in Revolt

Waterbury

• • • **A revolt of District 6,** made up of brass fabricators and smelters, of the International Union of Mine, Mill and Smelter Workers is under way. John J. Mankowski, the district's representative on the union executive board, has led the revolt against the international president, Reid Robinson, who is alleged to have communist sympathies. Elections have been called in 55 of the district locals to vote on seceding from the international union.

Preliminary returns from locals in Connecticut, Philadelphia and Baltimore indicate that the majority of union members are in favor of breaking away from the international with a view toward joining another CIO union or establishing an independent CIO union. Mr. Robinson has retaliated by ordering the suspension of Mankowski for his part in urging the secession of the district. Action has also been taken by the international union officials to impound wage deductions from the payroll of the American Brass Co. and other brass mills here.

Nonferrous Metals Prices

Cents per pound

	Jan. 29	Jan. 30	Jan. 31	Feb. 1	Feb. 3	Feb. 4
Copper, electro, Conn.	19.50	19.50	19.50	19.50	20.50	20.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	12.80	12.80	12.80	12.80	12.80	12.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	28.25
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.50
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	19.50
Copper, lake, Conn. Valley	19.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	12.80
Lead, New York	13.00
Magnesium, 99.8 + %	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$88 to $90
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$58 to $61
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	20.50
No. 120	20.00
No. 123	19.50
80-10-10 ingot	
No. 305	23.50
No. 315	22.00
88-10-2 ingot	
No. 210	25.75
No. 215	24.75
No. 245	21.75
Yellow ingot	
No. 405	16.25
Manganese Bronze	
No. 421	18.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	18.25
0.60 copper, max.	18.00
Piston alloys (No. 122 type)	16.75—17.00
No. 12 alum. (No. 2 grade)	16.50—16.75
108 alloy	16.50—16.75
195 alloy	16.75—17.50
AXS-679	16.50—16.75
Steel deoxidizing aluminum, notch-bar, granulated or shot.	
Grade 1—95 pct-97½ pct	16.75—17.00
Grade 2—92 pct-95 pct	16.25—16.50
Grade 3—90 pct-92 pct	15.75—16.00
Grade 4—85 pct-90 pct	15.25—15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	34⅞
Electrodeposited	28⅝
Rolled, oval, straight delivered	29½
Curved, 18 in. or longer, delivered	29½
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	31⅝
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	75

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz lots, per oz	74.5
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	.0635

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢ 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSa, ¼ in.,54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.35-$1.31; 24, $1.71-$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢; ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.25
Large, over 12 in.	14.25
Lithographic, ungrained	17.25

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	30.78	....	30.93
Copper, hot-rolled	....	27.28	....
Copper, drawn	....	28.28	....
Low brass, 80 pct	37.52	28.71	29.02
High brass	36.03	27.22	27.53
Red brass, 85 pct	38.03	29.22	29.53
Naval brass	27.50	26.25	32.19
Brass, free cutting	....	22.28	....
Commercial bronze	39.06	30.25	30.56
Manganese bronze	31.07	29.57	35.69
Phosphor bronze, 5 pct	....	49.07	48.82
Muntz metal	27.19	25.94	30.38
Everdur, Herculoy Olympic, etc.	34.45	34.73	35.79
Nickel silver, 5 pct	....	38.11	36.34
Architectural bronze	26.01	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of 15,000 lb or less)

Cartridge brass turnings	12⅞
Loose yellow brass trimmings	13¾

Copper and Brass

No. 1 heavy copper and wire	15 —15½
No. 2 heavy copper and wire	14 —14½
Light copper	13 —13¼
Auto radiators (unsweated)	10¾—11¼
No. 1 composition	14 —14½
No. 1 composition turnings	13½—14
Clean red car boxes	10½—11
Cocks and faucets	12¼—12½
Mixed heavy yellow brass	8¾— 9
Old rolled brass	8¾— 9
Brass pipe	11½—11¾
New soft brass clippings	11½—11¾
Brass rod ends	11½—11¾
No. 1 brass rod turnings	11¼—11½

Aluminum

Alum. pistons with struts	4½— 5
Aluminum crankcases	8¼— 8½
2S aluminum clippings	8¼— 8½
Old sheet & utensils	8 — 8¼
Mixed borings and turnings	3 — 3⅛
Misc. cast aluminum	7½— 8
Dural clips (24S)	6 — 6½

Zinc

New zinc clippings	7 — 7½
Old zinc	5¼— 5¾
Zinc routings	3 — 3⅛
Old die cast scrap	3 — 3¼

Nickel and Monel

Pure nickel clippings	31 —32
Clean nickel turnings	17 —18
Nickel anodes	19½—20½
Nickel rod ends	20 —31
New Monel clippings	14 —15
Clean Monel turnings	10 —11
Old sheet Monel	12 —12½
Old Monel castings	10 —11
German silver clippings, mixed	10½—11
German silver turnings, mixed	7 — 7¼

Lead

Soft scrap lead	11 —11½
Battery plates (dry)	6¼— 6½

Miscellaneous

Block tin	60
No. 1 pewter	46 —48
No. 1 auto babbitt	36 —37
Mixed common babbitt	12 —12½
Solder joints	13½—14
Siphon tops	38
Small foundry type	15 —15½
Monotype	12½—13
Lino and stereotype	12 —12½
Electrotype	10 —10½
New type shell cuttings (nom.)	12 —12½
Clean hand picked type shells	5½— 6
Lino and stereo dross	6 — 6½
Electro dross	4 — 4½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	16.25
Cut lead sheets	16.75
Lead pipe, manufacturing point	15.50
Lead traps and bends	List +38%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +38%
Lead wool	17.50

SCRAP

Heavy Melting Prices Up on Remote Sales

New York

• • • **The practice of buying** heavy melting steel scrap wherever it can be found almost without regard for freight cost has practically dried up local consuming market quotations. So much "remote" scrap is now moving into consuming centers at prices well above the local quotations that recognition of the fact is considered due by market observers. While some advances were posted, all consuming centers have not yet reacted.

It is pointed out that with Philadelphia quoted at a $32.50 top, New York at 30 and Boston at $29 and with some of this material moving into Pittsburgh, the former price of $32.50 did not represent the true cost of heavy melting grades in the steel city.

Scrap sources state that as long as a large proportion of shipments are earmarked, the consequent reduction in the volume available in the free market will make the market unusually sensitive pricewise.

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PITTSBURGH—The price of No. 1 heavy melting scrap on new orders in this area is at least $34 a ton. Price booms in other districts have caused brokers to ship tonnages on old orders at the $32.50 figure but take no new local orders. Likewise, shipments from customers are very heavy, and all at a figure of $32.50 or less. For example, Fisher and Budd bundles coming into the district at $32.50 probably are greater in total tonnage than all of the scrap generated in this area. Consequently, while the local market is lower, road haul scrap from other districts is selling for as high as $38 to $39.

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PHILADELPHIA—The scrap market grew stronger here this week with a rise of $1 in heavy melting prices, $2 in clean cast chemical borings, and 50¢ in heavy axle forge turnings. Dealers are reluctant to sell scrap at the former prices scenting increased prices from the higher prices going at other market districts. There is evident a slowing down in shipments which is the natural result of this trend.

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NEW YORK—Heavy melting scrap continued upward, hitting $30 late last week and the figure was still being paid early this week. While cast has had little part in the recent upward moves because of resistance by the larger buyers, isolated sales at higher prices are still being made by smaller foundries. Machine shop turnings shared in the rise of heavy steel scrap though not to the same extent, being currently quoted at a top of $23. Dealers report a gain in receipts by small scrap collectors but brokers indicate there has been little overall increase in volume because of the small portion of total shipments represented by this dealer material.

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CHICAGO—Heavy melting scrap moving in this area for $30 delivered is fast drying up. Plenty of scrap continues to be handled on trade deals and the price varies with the product involved. Dealers are looking at the higher scrap prices in surrounding areas and are becoming hesitant of shipping to brokers for $29.50 for Chicago consumption. Specialties continue to bring high prices and overall the market appears very strong with an upward surge possible at any time.

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BOSTON—The heavy melting steel market is excited with prices subject to change at any moment. Starting at $27 a ton a week ago, heavy melting steel has definitely reached $29 with every indication of going to $30. Brokers still short the market are on the hot seat. Recent buyers of local Navy Yard No. 2 steel at slightly better than $29 and unprepared at $25 did not make such a bad deal after all.

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DETROIT—While it is difficult to establish price changes in the Detroit scrap market there can be little doubt that the market is undergoing some active gyrations. Out-of-town buyers continue to strongly influence the local market and it is this pressure together with the general tightness of scrap supply which led Great Lakes to pay reported prices as high as $31 per ton to bring openhearth scrap to Detroit from outstate Michigan points. Reports on foundry scrap are conflicting, with some users badly in need of scrap paying a reported $44 per net ton while other orders have been filled this week at $43.50 per gross ton. Variations in scrap size and quality account for some of this differential of course. Rumors that auto and body companies have actually bought scrap to fill scrap-for-steel obligations have not been verified beyond the inquiry stage.

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BUFFALO—The light end of the scrap list advanced $1 to $1.50 a ton this week as demand for all grades continued heavy and shipments failed to expand. While none of the major consumers will pay more than $32 for No. 1 heavy melting, steel foundries are snapping up small offerings at $1 or more over this price. Scarcity of material is holding down operations of bundlers to about a third of capacity or approximately three cars a day compared with a potential output of ten.

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CLEVELAND—Prices currently quoted for the Cleveland geographical scrap district are largely nominal, with all signs pointing to some new and higher prices as the natural offspring of the present remote and local markets. The interaction of these markets on each other has most segments of the trade pretty well confused. With the market in its present state of demoralization, buyers profess their inability to buy No. 1 here at $32. They are, however, meeting the competition of brokers for consumers in other districts. Orders are out for representative tonnages of the electric furnace grades ranging from $35.50 to $36.50 in the Valley. A firm offer of $29 for short shoveling turnings in the Valley found no takers. Dealers complain that they cannot compete against the new steel offers or the trading. According to reports, a Valley consumer is paying $34.50 for good industrial miscellaneous. Some brokers and dealers in the Cleveland market are unable to cover on their $32 orders. The inescapable conclusion is that some higher orders are out, and that most consumers will be paying higher prices by the week-end.

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BIRMINGHAM—Bad weather has increased demand from northern consumers for all grades here and scrap yards are hard pressed to meet remote as well as local needs. Prices are up 50¢ on No. 1.

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TORONTO—Fresh snowstorms over the week-end again brought movement of scrap to a standstill in most sections of eastern Canada. In the Toronto area dealers are busy shovelling themselves out and there has been no movement of scrap in or out of yards for 3 or 4 days. The Canadian scrap situation remains critical insofar as domestic supply is concerned but some good tonnages have been brought in from England and Europe to meet urgent requirements.

Prices Are Nominal

New York

• • • **Most of the delivered heavy melting scrap prices quoted on a geographical area basis are now nominal, with little if any scrap moving at these prices. The competition between mills where they go to remote or foreign markets to obtain scrap at prices as much as $8 delivered their district above the so-called local prices has become so widespread that scrap is moving out of their normal buying districts enticed by higher prices offered elsewhere.**

Remote, or prices being paid for crosshauling cannot immediately be taken as the local market as long as there is a semblance of movement in those areas at the presently quoted prices but the point is fast being reached where the steel companies may have defeated their purpose and remote sales constitute practically all open market transactions except earmarked or tie-in sales.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.50 to $34.00
RR. hvy. melting	32.00 to 32.50
No. 2 hvy. melting	32.50 to 34.00
RR. scrap rails	38.00 to 39.00
Rails 3 ft. and under	40.00 to 41.00
No. 1 comp'd bundles	32.50 to 34.00
Hand bdld. new shts.	32.50 to 34.00
Hvy. axle turn.	32.00 to 32.50
Hvy. steel forge turn.	32.00 to 32.50
Mach. shop turn.	26.50 to 27.00
Short shov. turn.	28.00 to 28.50
Mixed bor. and turn.	27.50 to 28.00
Cast iron borings	27.50 to 28.00
No. 1 cupola cast	40.00 to 41.00
Heavy breakable cast	36.00 to 37.00
Malleable	40.00 to 41.00
RR. knuck, and coup.	36.00 to 36.50
RR. coil springs	36.00 to 36.50
Rail leaf springs	36.00 to 36.50
Rolled steel wheels	36.00 to 36.50
Low phos.	36.00 to 36.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	29.50 to 30.00
No. 1 bundles	29.50 to 30.00
No. 2 dealers' bndls.	29.50 to 30.00
Bundled mach. shop turn.	29.50 to 30.00
Galv. bundles	27.50 to 28.00
Mach. shop turn.	24.50 to 25.00
Short shovels, turn.	26.50 to 27.00
Cast iron borings	24.50 to 26.00
Mix. borings & turn.	24.50 to 25.00
Los. phos. hvy. forge	33.50 to 36.00
Low phos. plates	32.50 to 35.00
No. 1 RR. hvy. melt.	30.50 to 31.00
Reroll rails	33.50 to 34.50
Miscellaneous rails	38.00 to 40.00
Angles & splice bars	41.50 to 42.00
Locomotive tires, cut	39.00 to 40.00
Cut holster & side frames	35.50 to 36.00
Standard stl. car axles	38.00 to 39.00
No. 3 steel wheels	38.25 to 38.75
Couplers & knuckles	35.00 to 37.00
Malleable	43.50 to 45.00
No. 1 mach. cast	43.50 to 45.00
Rails 2 ft. and under	43.00 to 45.00
No. 1 agricul. cast	38.00 to 38.50
Hvy. breakable cast	38.00 to 38.50
RR. grate bars	35.00 to 36.00
Cast iron brake shoes	38.25 to 38.75
Stove plate	36.00 to 38.50
Clean auto cast	37.00 to 40.00
Cast iron carwheels	37.00 to 38.00

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	30.00 to 31.00
Mach. shop turn.	23.50 to 24.00
Shoveling turn.	24.50 to 25.00
Cast iron borings	23.50 to 24.00
Mixed bor. & turn.	23.50 to 24.00
Low phos. plate	30.50 to 31.00
No. 1 cupola cast	33.00 to 35.00
Hvy. breakable cast	31.00 to 33.00
Stove plate	28.00
Scrap rails	26.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$28.50 to $29.00
No. 2 hvy. melting	28.50 to 29.00
Nos. 1 and 2 bundles	28.00 to 29.00
Busheling	28.00 to 29.00
Turnings, shovelings	22.50 to 23.00
Machine shop turn.	20.50 to 21.00
Mixed bor. & turn.	20.50 to 21.00
Cl'n cast. chem. bor.	23.00
No. 1 machinery cast	40.00 to 45.00
No. 2 machinery cast	40.00 to 45.00
Heavy breakable cast	40.00 to 45.00
Stove plate	40.00 to 45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$26.75 to $27.25
No. 2 hvy. melting	26.75 to 27.25
No. 1 bundles	26.75 to 27.25
New busheling	26.75 to 27.25
Flashings	26.75 to 27.25
Mach. shop turn.	20.25 to 21.25
Short shov. turn.	21.75 to 22.25
Cast iron borings	$21.25 to $21.75
Mixed bor. & turn.	20.75 to 21.25
Low phos. plate	29.25 to 29.75
No. 1 cupola cast	41.25 to 44.25
Hvy. breakable cast	37.25 to 39.25
Stove plate	37.25 to 39.25
Automotive cast	nominal

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	31.50 to 32.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	31.50 to 32.50
Mach. shop turn.	23.00 to 24.00
Shoveling turn.	25.00 to 26.00
Mixed bor. & turn.	23.00 to 24.00
Clean cast chemical bor.	31.00 to 32.00
No. 1 cupola cast	43.00 to 45.00
Hvy. breakable cast	42.00 to 43.00
Cast. charging box	42.00 to 43.00
Clean auto cast	43.00 to 45.00
Hvy. axle forge turn.	32.00 to 33.00
Low phos. plate	35.00 to 36.00
Low phos. punchings	35.00 to 36.00
Low phos. bundles	32.50 to 33.50
RR. steel wheels	36.50 to 37.50
RR. coil springs	36.50 to 37.50
RR. malleable	44.00 to 45.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.25 to $33.00
Bundled sheets	32.25 to 33.00
Mach. shop turn.	27.25 to 28.00
Locomotive tires, uncut	34.50 to 35.00
Misc. std. sec. rails	36.00 to 40.00
Rerolling rails	40.00 to 42.00
Steel angle bars	35.00 to 37.00
Rails 3 ft. and under	40.00 to 42.00
RR. springs	36.50 to 37.00
Steel car axles	35.00 to 37.00
Stove plate	30.00 to 32.00
Grate bars	27.00 to 30.00
Brake shoes	30.00 to 32.00
Malleable	40.00 to 42.00
Cast iron carwheels	35.00 to 37.00
No. 1 machinery cast	35.00 to 37.00
Breakable cast	27.00 to 29.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.50 to $28.00
No. 2 hvy. melting	27.50 to 28.00
No. 2 bundles	27.50 to 28.00
No. 1 busheling	27.50 to 28.00
Long turnings	21.00 to 21.50
Shoveling turnings	23.00 to 23.50
Cast iron borings	21.00 to 21.50
Bar crops and plate	31.00 to 32.00
Structural and plate	31.00 to 32.00
No. 1 cast	37.50 to 38.00
Stove plate	30.00 to 31.00
Steel axles	30.00 to 31.00
Scrap rails	29.00 to 30.00
Rerolling rails	33.00 to 33.50
Angles & splice bars	32.00 to 33.00
Rails 3 ft & under	32.00 to 33.00
Cast iron carwheels	30.00 to 31.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.50 to $34.00
No. 2 hvy. melting	32.50 to 34.00
Low phos. plate	34.00 to 34.50
No. 1 busheling	32.50 to 34.00
Hydraulic bundles	32.50 to 34.00
Mach. shop turn.	26.50 to 27.00
Short. shovel, turn.	27.50 to 28.00
Cast iron borings	27.50 to 28.00
Elec. furnace punch	34.00 to 34.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	29.50 to 30.00
Comp. black bundles	29.50 to 30.00
Comp. galv. bundles	27.50 to 28.00
Mach. shop turn.	22.50 to 23.00
Mixed bor. & turn.	22.50 to 23.00
Shoveling turn.	24.50 to 25.00
No. 1 cupola cast	39.00 to 40.00
Hvy. breakable cast	39.00 to 40.00
Charging box cast	$39.00 to $40.00
Stove plate	39.00 to 40.00
Clean auto cast.	39.00 to 40.00
Unstrip. motor blks.	36.00 to 38.00
Cl'n chem. cast bor.	24.00 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.50 to $32.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	28.50 to 29.00
No. 2 hvy. melting	30.00 to 31.00
Mach. shop turn.	20.75 to 21.75
Shoveling turn.	22.25 to 23.25
Cast iron borings	21.75 to 22.75
Mixed bor. & turn.	20.75 to 21.75
No. 1 cupola cast	35.00 to 40.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 40.00
Malleable	33.00 to 33.50
Low. phos. plate	32.00 to 34.00
Scrap rails	29.75 to 30.25
Rails 3 ft. & under	33.75 to 34.25
RR. steel wheels	33.75 to 34.25
Cast iron carwheels	32.00 to 32.50
RR. coil & leaf spgs.	33.75 to 34.25
RR. knuckles & coup.	33.75 to 34.25
No. 1 busheling	30.00 to 31.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.50 to $32.00
No. 2 hvy. melting	31.50 to 32.00
Compressed sheet stl.	31.50 to 32.00
Drop forge flashings	31.50 to 32.00
No. 2 bundles	31.50 to 32.00
Mach. shop turn.	25.50 to 26.00
Short shovel	26.00 to 26.50
No. 1 busheling	31.50 to 32.00
Steel axle turn.	31.50 to 32.00
Cast iron borings	26.00 to 26.50
Mixed bor. & turn.	26.00 to 26.50
No. 1 machinery cast	37.50 to 40.00
Malleable	38.50 to 39.00
Railroad cast	40.00 to 45.00
Railroad grate bars	34.00 to 34.50
Stove plate	37.00 to 37.50
RR. hvy. melting	31.50 to 32.00
Rails 3 ft. & under	38.00 to 38.50
Rails 18 in. & under	40.00 to 40.50
Rails for rerolling	37.00 to 37.50
Elec. furnace punch	34.00 to 34.50

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50
No. 1 cupola cast	32.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melting	$19.00
Elec. furn. 1 ft. und.	22.50
No. 1 cupola cast	29.00
RR. hvy. melting	20.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Feb. 4, 1947	Jan. 28, 1947	Dec. 31, 1946	Feb. 5, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.20
Cold-rolled sheets	3.20	3.20	3.20	3.05
Galvanized sheets (10 ga.)	3.55	3.55	3.55	3.70
Hot-rolled strip	2.50	2.50	2.50	2.10
Cold-rolled strip	3.20	3.20	3.20	2.80
Plates	2.65	2.65	2.50	2.25
Plates, wrought iron	5.95	5.95	5.95	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.00	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	4.50	4.50
Special coated mfg. ternes	4.90	4.90	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.25
Cold-finished bars	3.20	3.20	3.20	2.75
Alloy bars	3.05	3.05	3.05	2.70
Structural shapes	2.50	2.50	2.35	2.10
Stainless bars (No. 302).	25.97	25.97	25.97	24.00
Wrought iron bars	6.15	6.15	6.15	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.00*
Light rails	2.85	2.85	2.85	45.00*
*per gross ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$39.00	$36.00
Sheet bars	50.00	50.00	38.00	36.00
Slabs, rerolling	42.00	42.00	39.00	36.00
Forging billets	50.00	50.00	47.00	42.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.15
Skelp	2.35	2.35	2.05	1.90

Pig Iron: (per gross ton)	Feb. 4, 1947	Jan.28, 1947	Dec. 31, 1946	Feb. 5, 1946
No. 2, foundry, Phila.	$32.51	$32.51	$32.43	$27.59
No. 2, Valley furnace.	30.50	30.50	30.50	25.75
No. 2, Southern, Cin'ti.	31.75	31.75	29.80	26.19
No. 2, Birmingham	26.88	26.88	26.88	22.13
No. 2, foundry, Chicago†	30.50	30.50	30.50	25.75
Basic, del'd eastern Pa.	33.67	31.93	31.93	27.09
Basic, Valley furnace.	30.00	30.00	30.00	25.25
Malleable, Chicago†	30.50	30.50	30.50	25.75
Malleable, Valley	30.50	30.50	30.50	25.75
Charcoal, Chicago	42.99	42.99	42.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$33.25	$32.25	$32.25	$20.00
Heavy melt'g steel, Phila.	32.00	31.00	31.00	18.75
Heavy melt'g steel, Ch'go	29.75	29.75	30.25	18.75
No. 1, hy. comp. sheet, Det.	27.00	27.00	27.75	17.32
Low phos. plate, Youngs'n	34.25	34.25	34.25	22.50
No. 1, cast, Pittsburgh	40.50	40.50	37.50	20.00
No. 1, cast, Philadelphia.	44.50	44.50	41.50	20.00
No. 1, cast, Chicago	44.25	44.25	44.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt.	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt.	8.50	8.50	8.50	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	19.50	19.50	19.50	12.00
Copper, Lake, Conn.	19.625	19.625	19.625	12.00
Tin, Straits, New York.	70.00	70.00	70.00	52.00
Zinc, East St. Louis.	10.50	10.50	10.50	8.25
Lead, St. Louis.	12.80	12.80	12.35	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	28.25	28.25	28.25	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 4, 1947	2.87255¢ per lb.	$30.15 per gross ton.	$31.67 per gross ton.
One week ago	2.87255¢ per lb.	$30.15 per gross ton.	$31.00 per gross ton.
One month ago	2.83599¢ per lb.	$30.14 per gross ton.	$31.17 per gross ton.
One year ago	2.54490¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.

	HIGH	LOW
1947	2.87255¢	2.87255¢
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2,32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

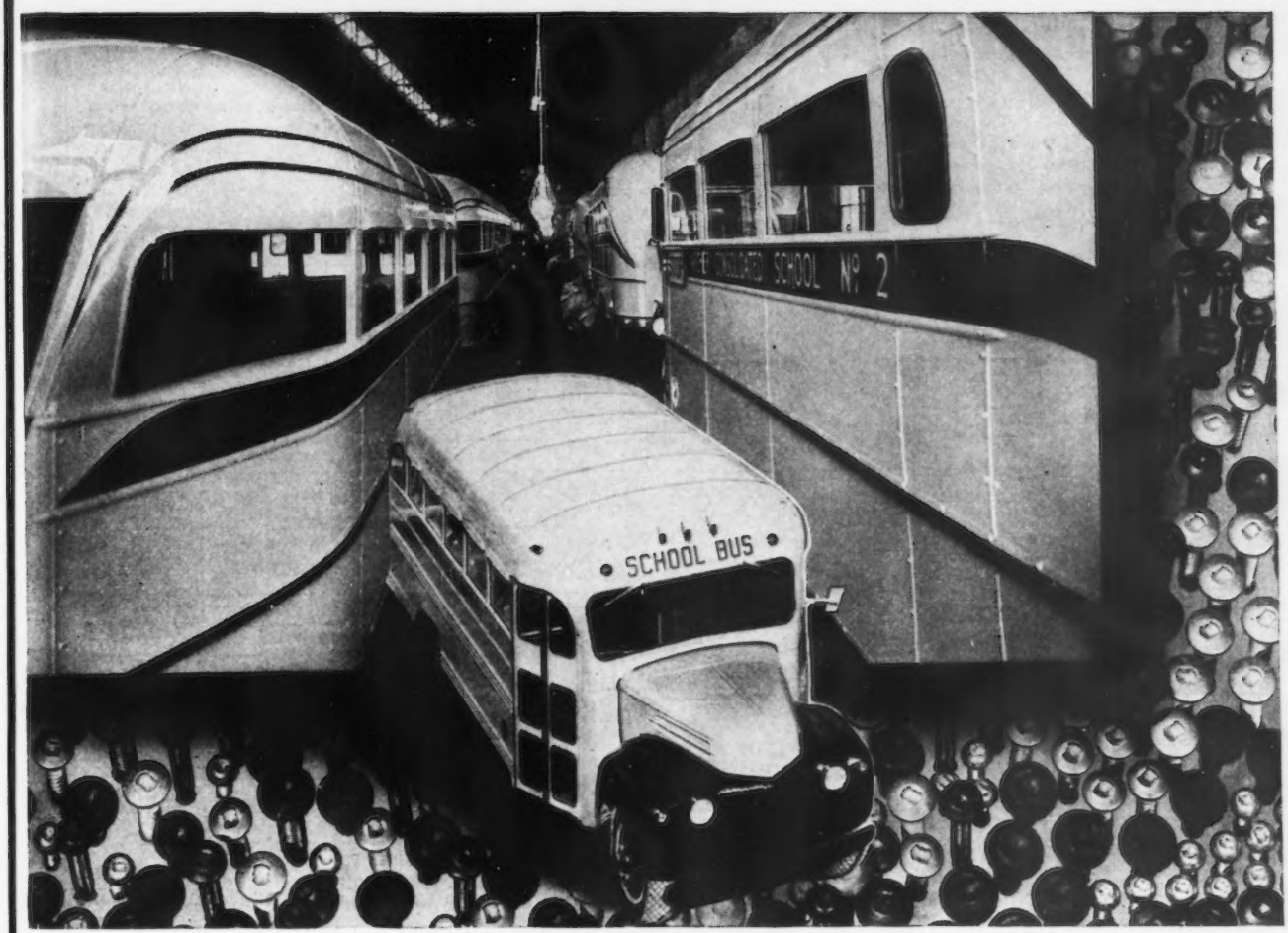
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

HIGH	LOW
$30.15 Jan. 28	$30.14 Jan. 7
$30.14 Dec. 10	$25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
$23.61	$23.61
23.61	23.61
23.61	23.61
$23.61 Mar. 20	$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
23.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11
18.84 Nov. 5	17.83 May 14
17.90 May 1	16.90 Jan. 27
16.90 Dec. 5	13.56 Jan. 8
14.81 Jan. 5	13.56 Dec. 6
15.90 Jan. 6	14.79 Dec. 15
18.21 Jan. 7	15.90 Dec. 16
18.71 May 14	18.21 Dec. 17

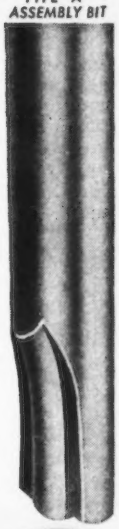
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH	LOW
$31.67 Feb. 4	$31.00 Jan. 7
$31.17 Dec. 24	$19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
$19.17	$19.17
19.17	19.17
$22.00 Jan. 7	$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
13.42 Dec. 10	10.33 Apr. 29
13.00 Mar. 13	9.50 Sept. 25
12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	6.43 July 5
11.33 Jan. 6	8.50 Dec. 29
15.00 Feb. 13	11.25 Dec. 9
17.58 Jan. 29	14.08 Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.



TYPE "A" ASSEMBLY BIT



COMMON SCREWDRIVER

THE HICKS BODY COMPANY

FINDS 7 MAJOR CLUTCH HEAD ADVANTAGES

At the Hicks Lebanon, Indiana, Plant, they produce School Buses which have to meet exacting strength standards for safety and security under operation in all types of climates from Maine to Florida. These bus bodies are all-steel sectional construction. As a result of change-over to CLUTCH HEAD Screws, the Hicks Body Company report:—

1. A 15% step-up in assembly driving operation.
2. Skid hazard materially reduced by dead-center entry for automatic straight driving.
3. Non-tapered driving faster, easier, and less fatiguing.
4. Operators find absence of ride-out with CLUTCH HEADS an important safety factor.
5. The Lock-On,uniting screw and bit as a unit, a decided advantage for one-handed driving.
6. 50% more screws driven by the Type "A" Bit before need for reconditioning.
7. Over 50% reduction in tool maintenance cost because of simplified 60-second reconditioning.

Investigatewhat these and the several other exclusive CLUTCH HEAD advantages mean in savings to your assembly line. We invite you to send for

CLUTCH HEAD SCREWS

package assortment of CLUTCH HEAD Screws, sample Type "A" Bit, and illustrated Brochure...by mail, and without obligation.

UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2 CHICAGO 8 NEW YORK 7

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. **Extras apply.** Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wires, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sect. 6. (13) Billets only.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio			DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00	$52.00				$52.00	(Bethlehem, Massillon, Canton, Coatesville=$52.00)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo=$53.20, Duluth=$44.00[13]) $42.00	$42.00					$44.50		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo=$61.20, Duluth=$52.00[13]) $50.00						$52.50		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton=$61.00)						$63.50		
SHEET BARS							$50								
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville=2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢	(Worcester=2.65¢)									
SHEETS															
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢			2.635¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.335¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢					3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.685¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP															
Hot-rolled [3]	2.50¢	2.50¢	2.50¢		2.50¢		2.50¢						2.635¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester=3.75¢)			3.335¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							4.09¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio=$5.75)		$8.157	$8.062[11]	
Electro, box 0.25 lb	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb	Deduct 50¢ from standard coke base box price.														
BLACKPLATE 29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢		(Warren, Ohio=$5.75)	3.94¢	3.99¢	3.90¢	
TERNES, MFG. Special coated, base box	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	(Duluth=2.70¢) (Provo, Utah=3.30¢)					2.735¢	3.01¢	2.98¢
Rail steel [6]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢					2.79¢	2.74¢	2.65¢
Reinforcing (rail) [7]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢						2.735¢		
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	(Detroit=3.25¢, Toledo=3.385¢)							3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton=3.05¢)					3.185¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.90¢		
PLATE								(Coatesville, Clayment=2.80¢, Geneva, Utah=2.80¢)							
Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	2.65¢					2.905¢	2.87¢	2.85¢
Floor plates	3.90¢	3.90¢											4.24¢	4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville=4.10¢)									4.01¢	3.895¢
SHAPES Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah=2.65¢) (Bethlehem=2.50¢)						2.61¢	2.70¢	2.64¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.55¢			3.55¢			(Worcester=3.75¢)								
0.51 to 0.75 carbon	4.80¢			4.80¢			(Worcester=5.00¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	8.85¢			8.85¢			(Worcester=9.05¢)								
WIRE [9]															
Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester=3.40¢, Duluth=3.35¢)						3.56¢	3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢			(Worcester=4.40¢)			(Trenton=4.50¢)			4.51¢	4.66¢	4.345¢
PILING															
Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.70¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.35
Light rails (from rail steel), f.o.b. Williamsport, Pa.	2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	62-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	24.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg
Standard, galvanized and coated nails	$3.75†
Cut nails, carloads	5.30

†10¢ additional at Cleveland.

	Base per 100 lb
Annealed fence wire	$3.95
Annealed galv. fence wire	4.40

	Base column
Woven wire fence*	84
Fence posts, carloads	82
Single loop bale ties	86
Galvanized barbed wire**	94
Twisted barbless wire	94

*15½ gage and heavier. **On 80-rod spools in carload quantities.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50	NAX
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Amer-ican Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.55
Galvanized	....	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	....	....	4.75	....	....	4.75	4.75	4.75	5.00*	4.55†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.ob. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
½-in.	55½	41
¾-in.	58½	45
1 to 3-in.	60½	47½
Wrought Iron, buttweld		
½-in.	2	+20
¾-in.	11½	+10
1 and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Steel, seamless		
2-in.	52	38½
2½ and 3-in.	55	41½
3½ to 6-in.	57	43½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
½-in.	54½	41½
¾-in.	58½	45½
1 to 3-in.	60	48
Wrought Iron, buttweld		
½-in.	6½	+14
¾-in.	12½	+ 8
1 to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$74.33
6-in. to 24-in., del'd New York	73.60
6-in. to 24-in., Birmingham	65.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	88.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
9/16 & ⅝ in. x 6 in. & shorter	52
¾ in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	48
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less case lots		
7/16 in. and smaller	..	51
½ in. and smaller	48	..
½ in. through 1 in.	..	48
9/16 in. through 1 in.	47	..
1⅛ in. through 1½ in.	45	46
1⅝ in. and larger	44	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts separate	60 and 10
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets
(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws (In packages)	Percent Off List Consumer
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	56
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF₂ Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 375 mesh	28⅝¢ to 30⅝¢
Copper, reduced, 150 and 200 mesh	22⅜¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	39¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.35
Lead, 100, 200 & 300 mesh	17.55¢ to 21.05¢
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51½¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$5.75
Connellsville, Pa., hand drawn	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads Per 1000
Sec. quality, Ohio	57.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	57.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

Pennsylvania and Birmingham	$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05

Midwest, add 10¢; Mo. Valley, add 20¢

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled (10 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
**Philadelphia	$4.24	$5.33	$5.29[a]	$4.43	....	$4.40	$4.22	$4.48	$5.38	$8.37	$8.37	$9.88	$9.88
New York	4.42	5.72[1]	5.47	4.62	5.25	4.72	4.37	4.62	5.42	8.42	8.42	9.92	9.92
Boston	....	6.218	....	....	5.156	....	....	....	5.468	....	....	....	....
Baltimore	4.09	....	5.14	....	....	4.39	4.34	4.45	5.35	....	....	....	....
Norfolk	4.35	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	4.00	....	....	4.00	....	4.30	4.05	4.05	4.95	8.10	8.10	....	9.35
Milwaukee	4.199	5.349	5.249	4.199	....	4.499	4.249	4.249	5.149	8.399	8.399	9.649	9.649
Cleveland	....	....	....	....	....	....	....	....	4.95	8.358	8.358	9.35	9.35
Buffalo	4.00	5.15	5.35	4.302	6.002	4.65	4.05	4.05	4.95	8.10	8.10	9.35	9.35
Detroit	4.14	5.29	5.42	4.34	....	4.59	4.42	4.19	5.00	....	....	....	....
Cincinnati	4.116	4.716	5.166	....	....	4.803	....	....	5.252	....	....	....	....
St. Louis	4.199	5.349	5.424	4.199	....	4.499	4.249	4.249	5.324	8.574	8.574	9.824	9.824
Pittsburgh	3.725	4.60[1]	....	4.00	....	3.95	3.80	4.05	4.95	8.10	8.10	9.35	9.35
St. Paul	3.384[7]	5.534[1]	5.434[2]	4.404[7]	....	4.684[7]	4.434[7]	4.434[7]	5.726[6]	....	10.084[6]	....	11.726[6]
Duluth	....	....	....	....	....	....	....	....	....	....	....	....	....
Omaha	4.868	6.618[1]	5.918	4.862	....	5.168	4.918	4.918	5.818	....	....	....	....
Indianapolis	....	....	....	....	....	....	....	....	....	....	....	....	....
Birmingham	3.85	....	5.20	4.10	....	4.30	4.05	4.05	5.83	....	....	....	....
Memphis	....	....	....	....	....	....	....	....	....	....	....	....	....
New Orleans	....	....	....	....	....	....	....	....	....	....	....	....	....
Los Angeles	....	....	....	....	....	....	....	....	....	....	....	....	....
San Francisco	4.90[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.90[8]	4.70[8]	7.00[10]	....	....	....	....
Seattle	5.00	7.80	6.05	....	....	5.25	4.95	4.90	6.75	....	....	....	....
Portland	5.00[3]	....	6.25	....	....	5.40	5.10	5.10	....	....	....	....	....
Salt Lake City	5.85	....	7.10	....	....	5.55	5.85	5.95	7.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia area only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area after deducting 34¢ per 100 lb (L.c.l. Sparrows Point to Philadelphia).

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	31.00	31.50	32.00	32.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	34.00	34.50	35.00	35.50	39.00	Boston	Birdsboro-Steelton	4.82	.....	.....	.....	.....	40.82*
Birmingham	26.38	26.88	.....	.....	.....	Brooklyn	Bethlehem	3.00	34.00	34.50	35.00	35.50	.....
Buffalo	30.00	30.50	31.00	31.50	.....	Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	43.50
Chicago	30.00	30.50	30.50	31.00	.....	Canton	Clev., Ygstn., Sharpsville	1.67	31.67	32.17	32.17	32.67	.....
Cleveland	30.00	30.50	30.50	31.00	.....	Cincinnati	Birmingham	4.87	31.25	31.75	.....	.....	.....
Detroit	30.00	30.50	30.50	31.00	.....	Jersey City	Bethlehem	1.84	32.84	33.34	33.84	34.34	.....
Duluth	30.50	31.00	31.00	31.50	.....	Jersey City	Birdsboro	2.33	.....	.....	.....	.....	41.33
Erie	30.00	30.50	31.00	31.50	.....	Los Angeles	Provo	5.94	35.94	36.44	.....	.....	.....
Everett	29.00	29.50	30.00	30.50	.....	Mansfield	Cleveland-Toledo	2.33	32.33	32.83	32.83	33.33	.....
Granite City	30.00	30.50	30.50	31.00	.....	Philadelphia	Swedeland	1.01	32.01	32.51	33.01	33.51	.....
Neville Island	30.00	30.50	30.50	31.00	.....	Philadelphia	Birdsboro	1.49	.....	.....	.....	.....	40.49
Provo	30.00	30.50	.....	.....	.....	San Francisco	Provo	5.94	35.94	36.44	.....	.....	.....
Sharpsville	30.00	30.50	30.50	31.00	.....	Seattle	Provo	5.94	35.94	36.44	.....	.....	.....
Steelton	31.00	31.50	32.00	32.50	36.00	St. Louis	Granite City	0.75 Arb.	30.75	31.25	31.25	31.75	.....
Swedeland	31.00	31.50	32.00	32.50	.....								
Toledo	30.00	30.50	30.50	31.00	.....								
Youngstown[1]	30.00	30.50	30.50	31.00	.....								

* To $43.82.

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base price for low phosphorous $37.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $42.99. High phosphorous charcoal pig iron is not being produced.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$38.00; f.o.b. Buffalo—$39.25. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.40	6.65	7.20
Ton lots	7.30	7.90	9.80
Less ton lots	7.70	8.30	10.20

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$39.00	$40.00
F.o.b. Pittsburgh		44.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	7.40
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.15
Ton lots	7.05
Less ton lots	7.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $56.00 f.o.b. Keokuk, Iowa; $52.75 f.o.b. Jackson, Ohio; $54.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	14.65	16.90	18.65
97% Si, 1% Fe	15.05	17.30	19.05

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb briquets.

	Eastern	Central	Western
Carload, bulk	3.85	4.10	4.30
Ton lots	4.75	5.35	5.65
Less ton lots	5.15	5.75	6.05

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	...	...
50% Si	7.45	7.95	8.15
75% Si	9.25	9.55	10.30
80-90% Si	10.45	10.75	11.50
90-95% Si	12.05	12.35	13.05

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr, 4-6% C, 6-9% Si	16.60	17.00	17.15

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.35
Less ton lots	22.00	22.65	23.35

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	13.50	14.60	16.55
Less ton lots	14.25	15.35	17.30

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed — $1.88

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 — $1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.

Ton lots	$2.50
Less ton lots	$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo — 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo — 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo — 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo — 80¢

Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti — $1.22

Less ton lots — $1.25

Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti — $1.35

Less ton lots — $1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton — $142.50

Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton — $58.50

Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton — $75.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots — 14.50¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk — 4.25¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload — 6.25¢

Ton lots — 6.75¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound of alloy.

Carload lots	25¢
Ton lots	27¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Says Transportation System Will Be Influenced by Traffic Men

Sioux City, Iowa

• • • A. H. Schwietert, traffic director of the Chicago Assn. of Commerce and Industry, in an address before the Central Western Shippers Advisory Board and the Traffic Club declared, "The conclusions and positions taken by the transportation men will greatly influence the efficiency of our national transportation system, will determine whether it will be privately owned and operated and will also have an important bearing upon our entire economy."

Mr. Schwietert pointed out that the cooperative action between shippers and carriers has often been demonstrated, but probably never more forcefully than during World War II. He said, "With 33 pct fewer locomotives, 24 pct less freight cars, 30 pct less passenger cars, and 23 pct fewer employees, the railroads hauled 82 pct more ton miles and 124 pct more passenger miles in 1944 than they did in 1918. Exact figures for other carriers are not available and we have therefore confined our comparison to railroad statistics to illustrate the increased efficiency in transportation during World War II compared with World War I."

The speaker pointed out that this remarkable performance was due to two basic and fundamental factors. They were first "the planning efforts of carriers and shippers together with cooperation of the Interstate Commerce Commission and the Office of Defense Transportation which was responsible for keeping cars rolling and eliminated almost entirely the use of cars for storage, which we know was responsible for congestion and lack of equipment in World War I.

"The second is private operation. The government, the taxpayer and the public fared much better under private operation during World War II than they did under government operation in World War I. The difference to the taxpayers was approximately $5 million a day. Federal operation cost the taxpayer from Jan. 1, 1918, to Mar. 1, 1920, roughly

A. H. Schwietert Declares It Is Up to Them Whether System Is Privately Operated

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$1.6 billion, or an average of $2 million a day. Although there were increases in wages, in prices of materials and in taxes, freight and passenger rates remained approximately the same during the war period; whereas during World War I, both freight and passenger rates were increased substantially."

Mr. Schwietert went on to say that while the carriers were handling this vast transporting problem regular civilian traffic service continued with no undue delay or inconvenience to the public.

Regarding freight rates the speaker said, "To a certain extent cooperation in rate making has existed through the carrier rate bureau procedure. This practice is now under attack by the Dept. of Justice as a violation of the Sherman Anti-Trust Act, although there is no actual agreement to fix rates and all the results are subject to review by the ICC or state regulatory commission.

"During the last Congress a bill known as the 'Bullwinkle Bill' was introduced to make it clear that the practice and procedure of carrier rates bureaus were not unlawful and should be continued subject to such rules and regulations as may be prescribed by the ICC. The bill passed the House by a large majority but failed to pass the Senate before adjournment of Congress." He continued by informing the group that "A similar bill has been introduced in the present Congress within the last few days.

"If shippers were required to deal with each individual carrier, and such carriers make rates without regard to the rates made by other carriers, discrimination between individuals and between communities would exist to a degree never before experienced in the history of the country." Such a situation, the speaker said, "would amount to a return to the law of the jungle with destructive competition among carriers in lieu of the long standing policy of regulated competition which prevails today."

Turning to the recent freight rate increase, Mr. Schwietert said, "The ICC has recently rendered its decision on Ex Parte 162 allowing railroads a substantial increase in freight rates. While the increase in cost of operation was brought about by increases in wages and in the cost of materials and supplies, the change in volume, character and type of traffic transported since the war period made an immediate increase in rates necessary.

"The increased cost and wages took place during the war period, but revenues also increased proportionately due to the type and increased volume of traffic so that advances in rates were not required at that time. Revenue ton

JUST PLUG IT IN: *Although there is nothing unusual about electric trucks, the revival of electric passenger cars in France indicates the sad status of gasoline supply there. These vehicles at a factory at Puteaux near Paris are all electrically driven. The cars will run about 50 miles at 25 mph after which their rechargers must be plugged into house current to be revived for the next trip.*

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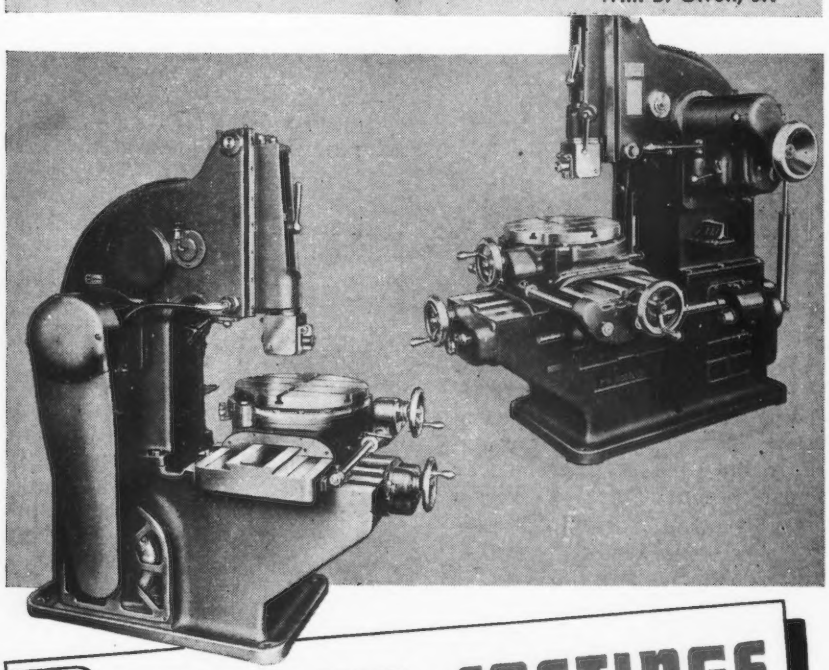
Wm. B. Given, Jr.



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IN making vertical shapers in 6-inch and 12-inch sizes, Pratt & Whitney Division, Niles-Bement-Pond Company took all possible steps to avoid vibration. One very important decision was the selection by P & W metallurgists of Meehanite castings made by Brake Shoe for all main castings of both shapers, including the bases.

Superior damping capacity at a high stress range was only one of many requirements when these castings were chosen. Included also must be rigidity and the required high degree of strength which Meehanite castings also provide. As a result, smooth easy operation is promoted and accuracy maintained.

Physical and metallurgical properties that are "made to order" are available to users of Meehanite castings on a production-schedule basis. The range of types is so wide that *your work specifications are the casting specifications.* And, like a good machine tool, Meehanite castings made by Brake Shoe are soundly based — based on the experience, knowledge of foundry technique, and the research-plus-production facilities of the entire Brake Shoe organization.

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miles for 1946 are estimated at $585 billion compared with $680 billion in 1945 and $737 billion in 1944. The fact that increased rates are now necessary indicates how important volume of traffic is in the economic operation of our transportation system," the speaker said.

He went on to explain, "There is a school of thought which firmly believes that increase in railroad rates has resulted in a rate structure that will restrict the distribution and interchange of commodities, bring about a further decentralization of industry and a decline in traffic volume. Per unit cost would then further increase requiring still further increases in rates and thus start a vicious circle that would seriously disrupt our entire economy.

"They believe that lower rates would encourage the movement of traffic, would attract new business and thus result in better net earnings for the carriers. It is extremely important to the maintenance of private ownership and operation that the financial structure of the carriers remain sound." According to the traffic director, "If we are to have any reduction in rates, it must come about through greater efficiency in operation and a reduction in the per unit cost.

"This may be done and no doubt will be done in several ways, by way of technical improvements in equipment, by changes in operation, by coordination of the several forms of transportation, and by utilization of that type of carrier which is best suited to perform the particular task, and by a revision of the rate structure to meet competitive conditions." Mr. Schwietert declared that one of the important factors, "is the elimination of the so-called feather-bed rules."

Mr. Schwietert recalled that in 1923 Senator Bailey of North Carolina, chairman of the Senate Commerce Committee, called the "feather-bed" situation to the attention of the Senate and referred to a report which claimed that approximately 200 million manhours a year were wasted by this process. The speaker pointed out, "When we consider a rate of pay of 110.8¢ per hr straight time the total loss amounts to $221,600,000 or more than one-fourth of the amount of $1 billion which the ICC

Designed to be better with

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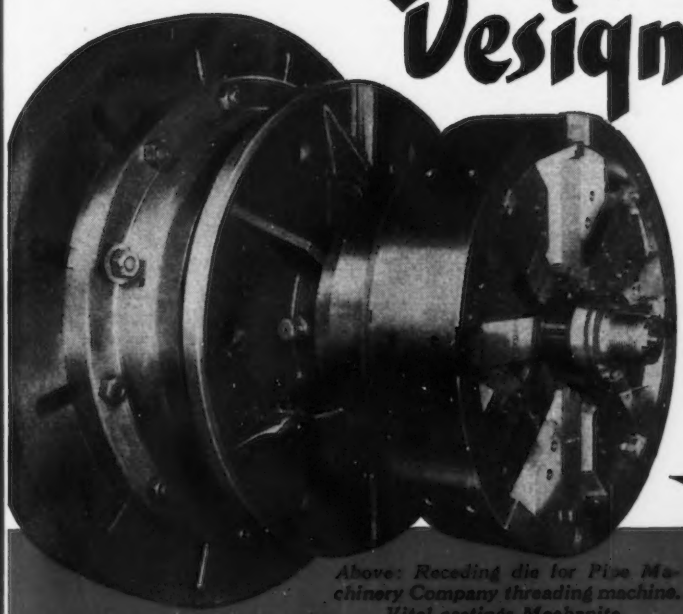
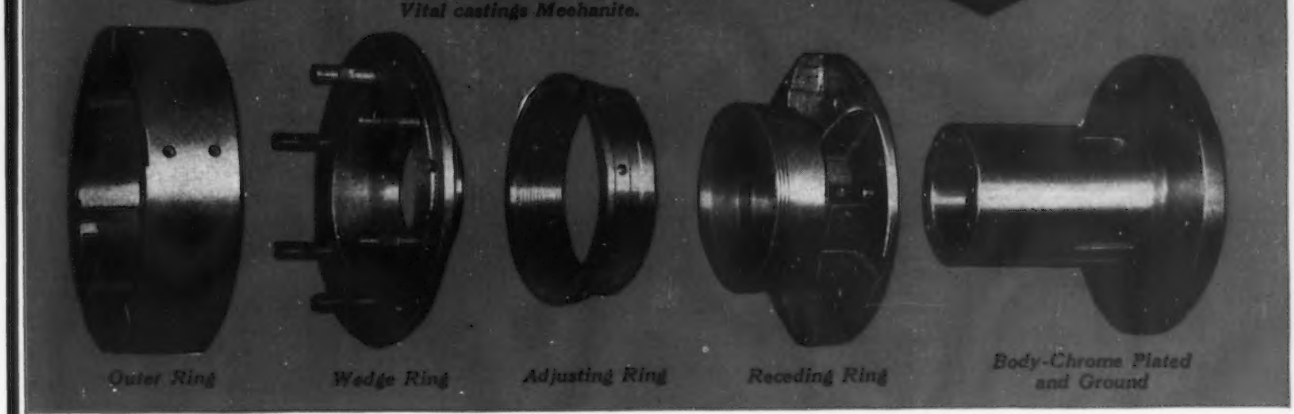


Above: Receding die for Pipe Machinery Company threading machine. Vital castings Meehanite.



Write for our Bulletin No. 22 "Stories of Meehanite in Industry."

Only quality, high precision machinery is produced by The Pipe Machinery Company, Cleveland, Ohio. Outstanding in their line is pipe threading equipment producing API quality threads.

Illustrated is a receding chaser die for pipe threading and the five *important* Meehanite Castings embodied in its construction.

Note that the body casting is chrome-plated and ground, to extremely close tolerances. All these Meehanite Castings are produced in Type GA Meehanite providing a minimum tensile strength of 50,000 psi (1.2" diameter test bar), uniformly solid, dense and machinable castings, which maintain their original accuracy permanently.

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has estimated would result from the increases granted to the railroads in Ex Parte 162."

The assembly was also told that, "It is also important to note that much competition can develop from private industry use of all forms of transportation except railroads. As a result, intercarrier competition presents the most important and far reaching problems confronting transportation today.

In explaining the importance of a traffic man's function and his responsibility to the nation, Mr. Schwietert related that, "In the periods of 1930 to 1939 a great deal of study was given to the transportation problem and much of it had to do with what was termed an overexpanded transportation system. The development of other forms of transportation and the improvements made by the railroads during the twenties developed a plant capacity which was far more than necessary to carry the traffic of the country during the thirties.

"While the present shortage of transportation equipment, due to the inability to obtain material and supplies, may cause us to forget the experience of the thirties, there is nevertheless a great danger that once production gets into full swing and each form of transportation proceeds with a modernization program, an excess of transportation facilities will again develop.

"As previously explained the volume of traffic is a most important factor in the economical and efficient use of transportation facilities. To divide the traffic among so many different forms of transportation and thus only partially utilize the equipment of each, is bound to bring about increased costs and a series of carrier bankruptcies."

Mr. Schwietert closed his remarks with, "If the traffic manager will continue to deal soundly with transportation problems and extend his thinking beyond freight rates, filing of claims or auditing bills and other clerical duties of a similar nature, he is bound to receive the recognition he deserves. He must, however, assume the responsibilities and deal with the transportation problems in a statesmanlike manner."

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● The versatility of the Lectromelt Furnace in economically melting either large or small heats is of great advantage where the user requires a wide variety of castings. The entire heat may be tapped or part of the heat may be tapped and the analysis of the remainder altered as desired. This means economy of power, time, and metal.

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AFA Forms New Chapter In Rocky Mountain Area

Chicago

• • • **Inauguration** recently of a Rocky Mountain Empire chapter, with headquarters in Denver, gives the American Foundrymen's Assn. 35 active chapters in North America, including two in Canada and one in Mexico, according to W. W. Maloney, secretary-treasurer.

The Rocky Mountain chapter, created by the petition of 71 Colorado foundrymen representing 35 companies, was installed Jan. 14 at a "kick-off" dinner meeting in Denver at which Mr. Maloney outlined the association's objects and activities and presented the society's famed cast iron rattle to the new group.

Officers of the Rocky Mountain chapter, all of Denver, are J. L. Higson, partner, Western Foundry, chairman; W. R. Manske, works manager, American Manganese Steel Div., American Brake Shoe Co., vice-chairman; C. E. Stull, manager, Manufacturers Foundry Corp., secretary, and J. W. Horner, vice president, Slack-Horner Brass Mfg. Co., treasurer.

Directors are R. A. Bolen, president, Bolen Manufacturing Co., Grand Junction, Colo.; Jack Carter, works manager, American Foundry & Machine Co., Salt Lake City, and, of Denver; S. C. Cooke, secretary-treasurer, U. S. Foundries, Inc.; B. E. Dixon, superintendent, Brake Shoe and Casting Div., American Brake Shoe Co.; C. C. Drake, superintendent, Griffin Wheel Co.; E. B. McPherson, president, McPherson Corp., and P. M. Payne, vice president, Rotary Steel Castings Co.

J. L. Higson served as chairman and P. M. Payne, as secretary during the organization period. W. R. Manske headed the group's by-laws committee and E. B. Zabriskie, Magnus Steel Div., National Lead Co., Denver, was chairman of the nominating commitee.

Membership in the new chapter is open to foundrymen and representatives of allied trades in Colorado, Utah, Wyoming, New Mexico, western Kansas, southwestern Nebraska, northwestern Texas and western Oklahoma.

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Macwhyte also makes: MACWHYTE PREformed and Non-PREformed Internally Lubricated Wire Ropes... MONARCH WHYTE STRAND Wire Rope... Special Traction Elevator Rope... Stainless Steel Wire Rope... Monel Metal Wire Rope... Galvanized Wire Rope... Hi-Fatigue Aircraft Cables, Assemblies and Tie-Rods. *Catalog, literature on request.*

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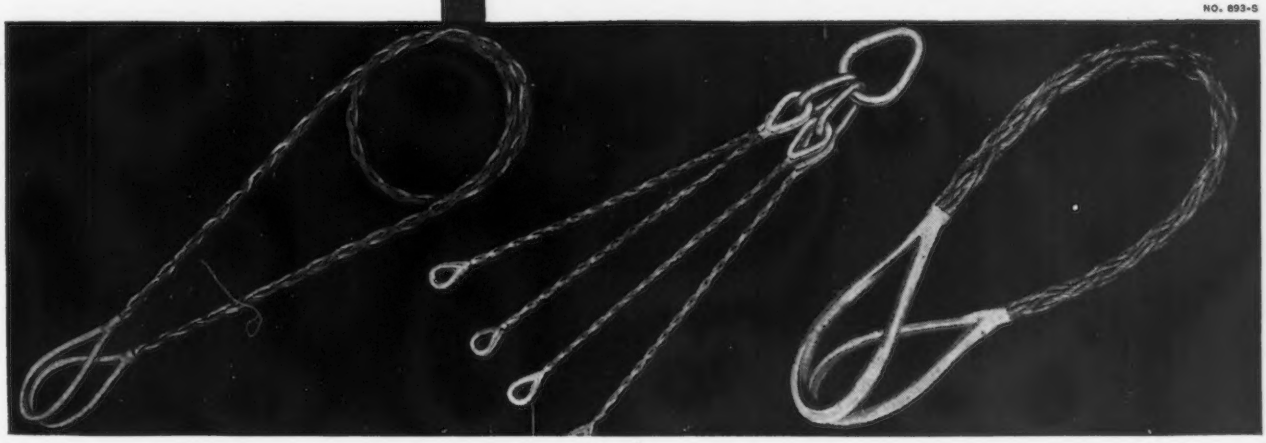

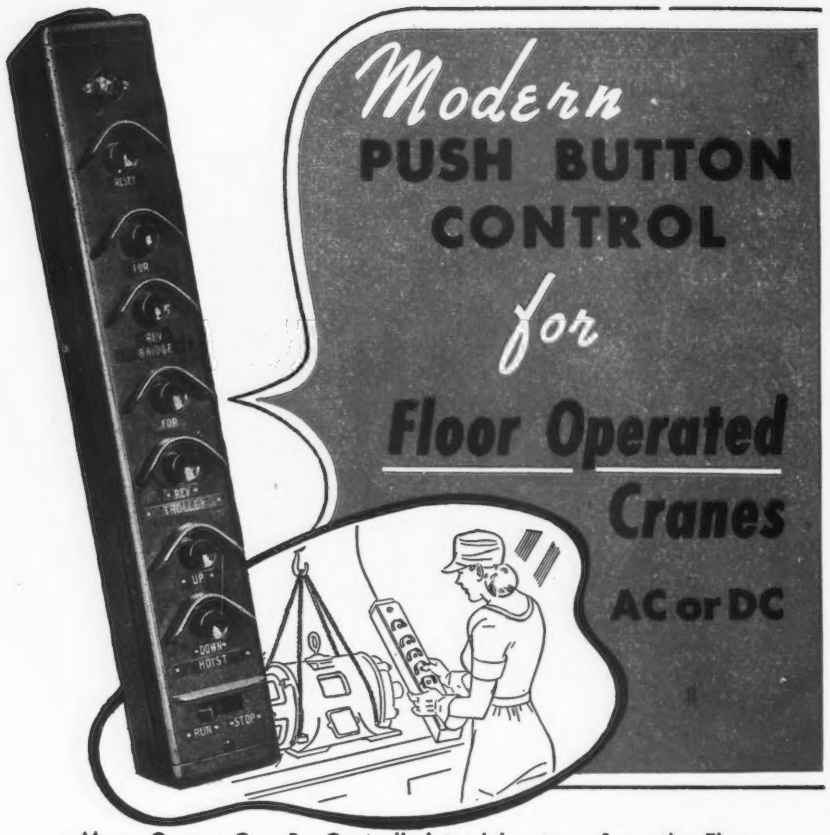

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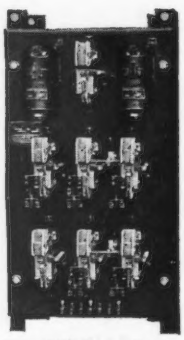
THIS EC&M Control for **floor-operated** cranes has all the advantages of the well known EC&M Control for **cab-operated** cranes. A single pendant master-station, with two Push Buttons for each motion, makes possible the control of all crane movements. Individual rope-operated Master Switches can be had if desired.

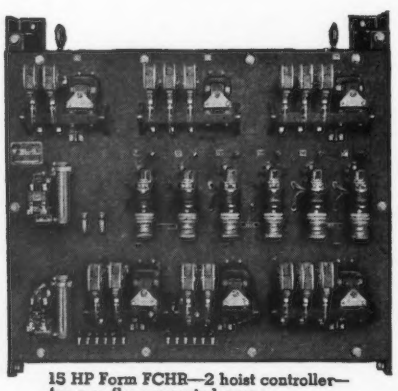
Among the advantages of this standardized line of controllers are (1) accurate inching, (2) compact mounting, and (3) minimum collector-bar requirements. They can be conveniently installed along the crane girders or mounted on the trolley.

Resistors are carefully proportioned for low-torque hoisting of light loads and also provide smooth acceleration for bridge and trolley.

Send for Bulletins 922 (D.C.) and 931 (A.C.) which illustrate and completely describe these units.



Form FCR Controller for trolley or bridge motion —for direct current floor-operated cranes.



15 HP Form FCHR—2 hoist controller—for a.c. floor-operated crane.

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Sees No Domination Of Rubber Products By Natural Rubber

Akron, Ohio

• • • **Natural rubber** may never again dominate the industrial rubber products market as it did five years ago, according to W. C. Winings, manager of Goodyear's Mechanical Goods Div.

Mr. Winings bases his prediction on the fact that intensive research and development work on synthetic rubber during the war years and the versatility of the synthetic products in meeting specific needs for industrial rubber products has succeeded in establishing synthetic rubber in many fields formerly dominated by natural products.

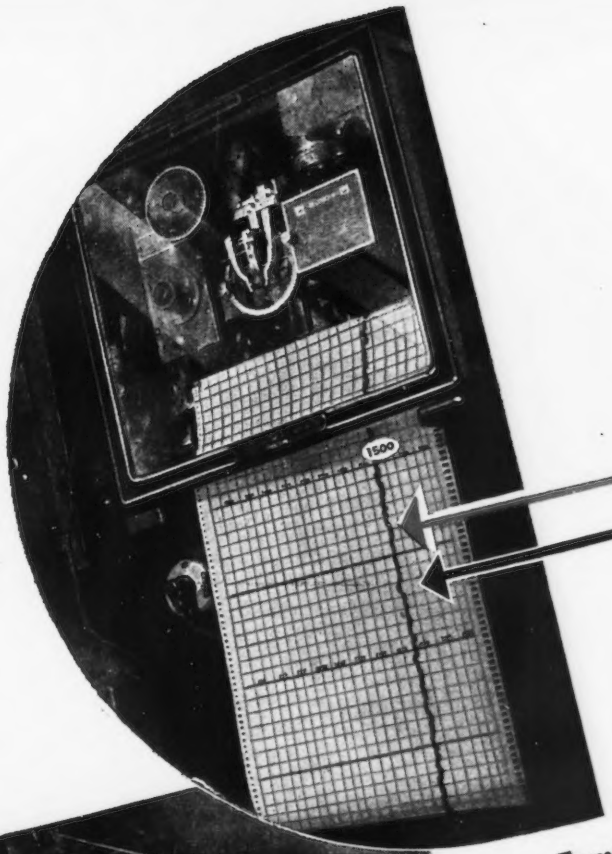
Despite steadily - increasing availability of tree rubber for such products as hose, gaskets, vibration dampeners, power-transmission belts, conveyor belts and other industrial applications, Mr. Winings said, natural rubber is being used only to improve the quality of synthetic materials.

During the war, according to Mr. Winings, when natural rubber was scarce producers of rubber products were forced to compress into four or five years of research and development work on synthetic rubber which might otherwise have taken 30 years.

One by-product of the war years, Winings continued, was the development of synthetic materials for specific applications requiring resistance to oil and abrasion. The range of potential formulation for specific purposes is much greater in synthetic rubber than in the natural material, he said.

Many new compounding ingredients have been developed for various types of plasticizers, Mr. Winings added, and these materials have already distinguished themselves in industrial applications.

Mr. Winings indicated that the first new supplies of natural rubber will find their way into such items as conveyor belts and in certain types of sand-blast hose. Here the softness of natural rubber alleviates the abrasive or cutting effects of sharp objects coming in contact with it. However, he stated, synthetic rubber will continue to be blended with the



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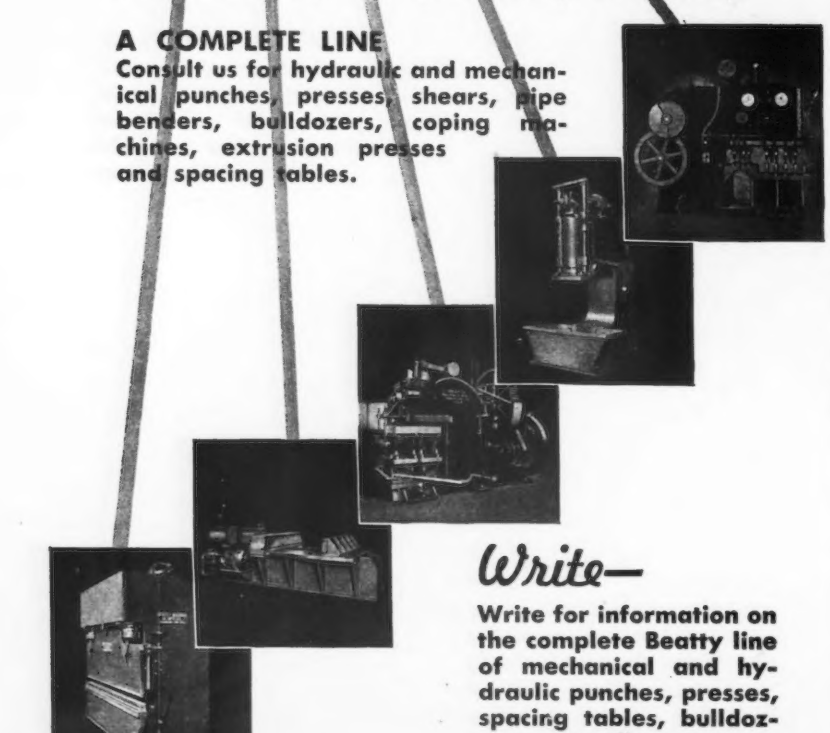

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natural to preserve such qualities as resistance to oil, acids, cracking in sunlight and brittleness caused by drying-out.

The Goodyear executive mentioned tank lining as a specific case where natural rubber will have a hard time regaining its position.

It was stated that floor mats in automobiles, pedal and running board covers are molded, as before the war, from top-quality reclaimed rubber.

WAA to Hold Mammoth Sale of $3 Billion Worth Of Surplus Equipment

Washington

• • • **Approximately** $3 billion worth of surplus capital and producer goods was placed on sale by WAA beginning Feb. 1 through 36 national sales launched by regional offices of the disposal agency.

This giant sale was launched under WAA's "must" program which provides that all inventories must be put on sale within a month after declaration, that minor line items must be disposed of within 30 days, and that major line items be sold within 58 working days.

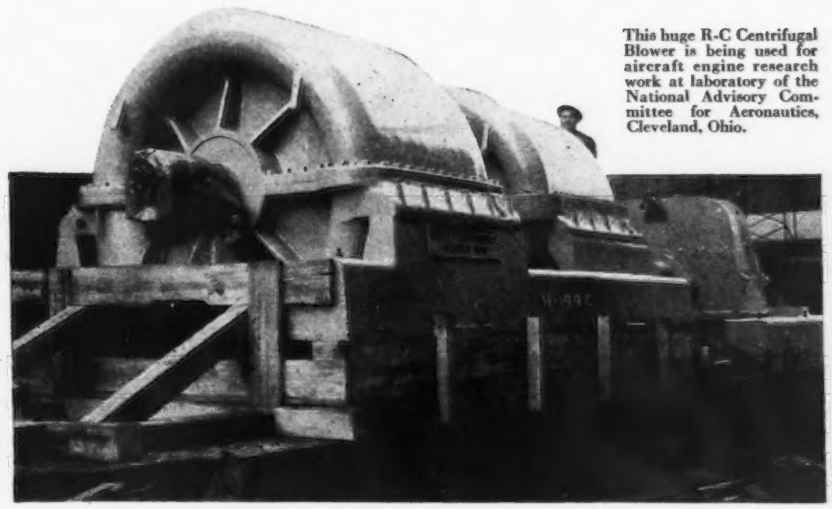
General classifications, dollar value at original cost, and whether disposals are by fixed price or competitive bid, are as follows:

Industrial Power Equipment: Line hardware, $2.3 million, competitive bid; internal combustion engine spare parts, $25 million, fixed price; terminal and stuffing tubes, $1.2 million, competitive; storage batteries, $1.4 million, competitive; lighting equipment, $4 million, competitive; portable, metalworking, pneumatic and electric tools, $16 million, fixed; troop, sleeper, and kitchen cars, $28 million, fixed; locomotives and rolling stock, $54 million; and miscellaneous, $21 million.

Special Industrial Equipment: Heat treating furnaces, $12 million, fixed and competitive; welding equipment, $6.5 million, $10 million, fixed except special units; tubular steel cutting electrodes, $1 million, competitive; and miscellaneous, $6.5 million.

Abrasives, Bearings and Cutting Tools: Abrasives, $15 million, competitive; production and automo-

Freight car loaded with WIND



This huge R-C Centrifugal Blower is being used for aircraft engine research work at laboratory of the National Advisory Committee for Aeronautics, Cleveland, Ohio.

This freight car packs hurricanes! It's loaded with a Roots-Connersville Centrifugal Blower that in just one minute can push the air out of a 10′ circular tunnel, 450 feet long. Or, it can blow a gentle breeze, too, if that's what is wanted.

Not all industrial blowers are that big. But whether they're big or little, Roots-Connersville builds them down to the small Rotary Positive units delivering only ten cubic feet per minute. With both Rotary and Centrifugal equipment to choose from, our engineers can recommend the size and type that will precisely match your requirements. That's R-C *dual-ability*.

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- Grain conditioning or bleaching
- Departmental gas metering
- Heat-treating and annealing
- Vacuum filtration processes
- Boosting gas system pressure
- Priming centrifugal pumps
- Transporting live fish
- Supplying safety helmet air
- Mining and smelting
- Unloading tank cars and trucks
- Supercharging or scavenging Diesels
- Paper mill vacuum processes
- Drying textile yarns
- Reducing explosion hazards

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tive bearings, $23 million, competitive; cutting tools, $54 million, competitive; and, standard general purpose machine tools, $5.5 million, fixed.

Iron and Steel: Tool steel, $7.5 million, sealed bid; wire rope and cable, $8 million, sealed bid; and, valves and fittings, $20 million, sealed bid.

Automotive and Machinery: A $75 million sealed bid program is underway in Detroit for the disposal of parts, assemblies and accessories; a special sealed bid sale to dispose of parts and items on List 107, valued at $2 million is being prepared; and, an open bid sale will be held to dispose of $2.5 million worth of automotive maintenance equipment.

INCO and Falconbridge Step Up Nickel Output

Toronto

• • • **International Nickel** Co. of Canada Ltd. shows increased production and exports in the past few months, according to official reports from the Dominion Bureau of Statistics. For the first six months of 1946, output of nickel in Canada totaled 90,352,579 lb, a monthly average of 15,058,763 lb; in the following four months to Oct. 31, the latest actual figure available, output was 64,857,288 lb, an average of 16,214,322 lb per month.

The extent of the improvement may be judged by the fact that for the first 10 months of 1946, output was sharply down from the year previous to 155,209,867 lb, compared with 215,436,273 lb in the same period of 1945, an actual loss in output of over 60,000,000 lb.

Falconbridge Nickel Mines Ltd. also has been stepping up production, but most of the nickel output from its Sudbury mines is shipped to its refinery in Norway and disposed of in the European market. Falconbridge Nickel has recently increased production from 50 to 70 pct of capacity and expects to attain a rate of 75 pct by the end of this month. Last fall when Falconbridge was operating at 50 pct of capacity its output was at the rate of 12,000,000 lb of nickel a year, plus copper, but under its increased rate will be turning out 18,000,000 lb a year.

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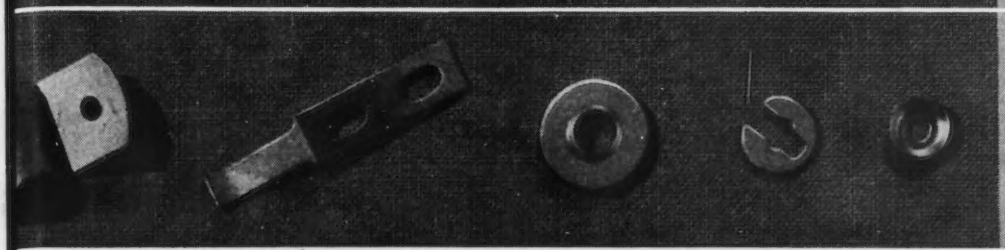
Diamond G makes a full line of hollow and flush type finishing washers. Available in all finishes and types of metals.



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Garrett's modern facilities for stamping and precision heat treating make it possible to produce spring stampings of the highest quality. Producing special spring stampings to exact specifications in an amazingly short period of time is a specialty of Garrett's.

SMALL PARTS
DIAMOND G MAKES THEM!

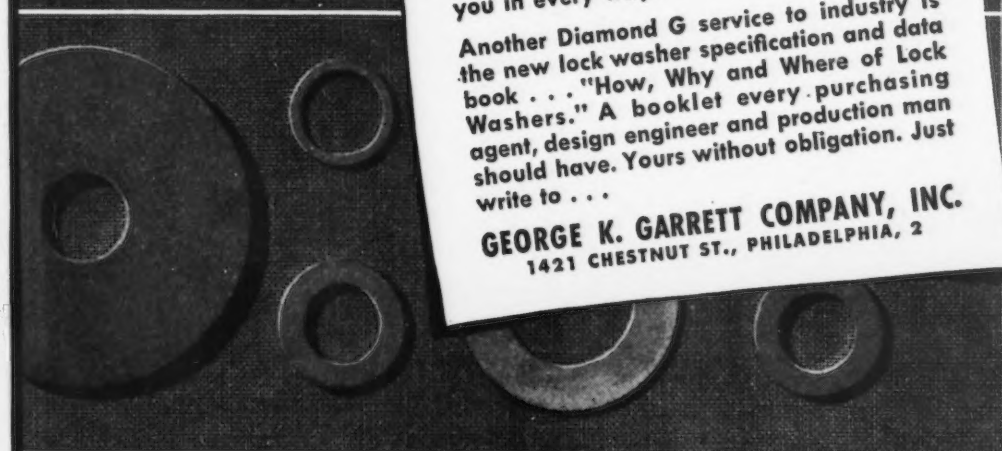
Whatever your need in small parts—lock washers, flat washers, special washers, snap and retainer rings, stampings of all kinds and hose clamps, Diamond G is ready to make quick deliveries. Diamond G also offers its complete facilities to produce special parts you may need in your products. Diamond G Engineers stand ready to help you in every way.

Another Diamond G service to industry is the new lock washer specification and data book . . . "How, Why and Where of Lock Washers." A booklet every purchasing agent, design engineer and production man should have. Yours without obligation. Just write to . . .

GEORGE K. GARRETT COMPANY, INC.
1421 CHESTNUT ST., PHILADELPHIA, 2

SPRING WASHERS

Diamond G has built an outstanding reputation for producing a wide variety of spring washers. They offer manufacturers an excellent source of supply for special shaped, curved, dished and cupped spring washers.



FLAT WASHERS

Outstanding in the Diamond G line of products are the many flat washers made by Garrett's. It offers industry a quick and dependable source of a complete line of flat washers including SAE, machine-screw, and aircraft washers in all sizes, thickness, metals and finishes. Garrett's also produce a complete line of snap, space and retainer rings for all types of industrial installations.

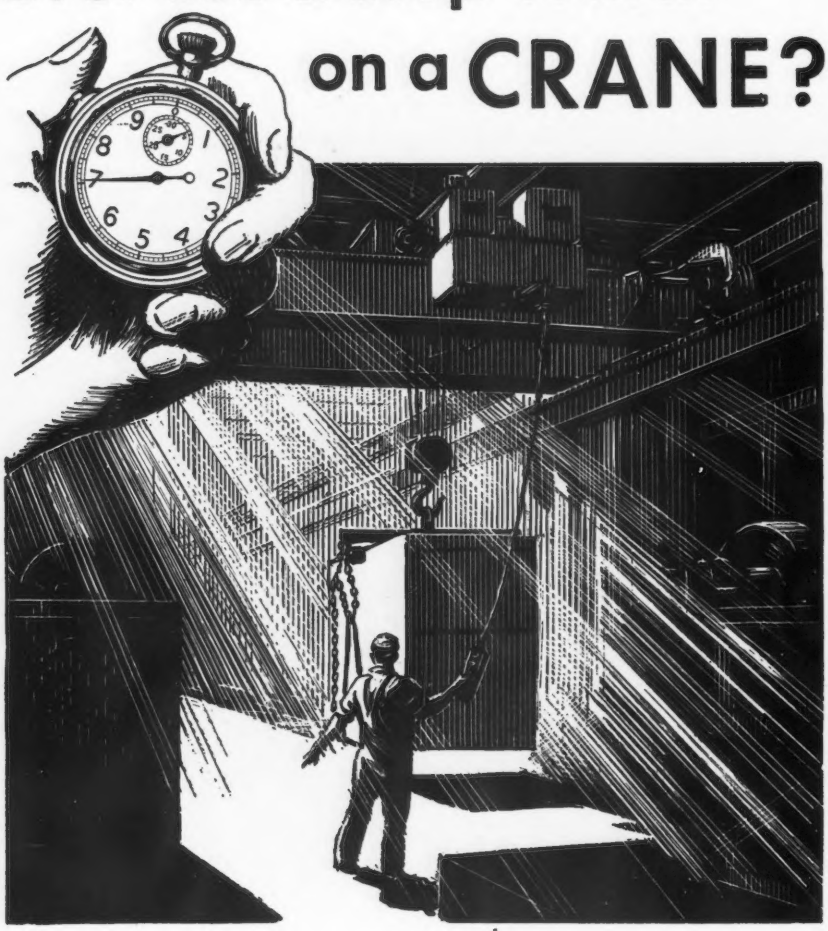
HOSE CLAMPS

Garrett's line of hose clamps includes both types to provide the manufacturer with the answer to his problems. The Diamond G Multi-Clamp is the ideal clamp of a thousand uses which can be used on automotive, hydraulic, pneumatic, electronic and aviation installations. The Diamond G Auto-Seal Clamp is truly the all-purpose economy clamp for every industrial use . . . is rugged and provides a tight seal on every joint.

DIAMOND G PRODUCTS

LOCK WASHERS • • FLAT WASHERS • • STAMPINGS • • SPRINGS • • HOSE CLAMPS • • SNAP AND RETAINER RINGS

Ever use a Stop Watch on a CRANE?

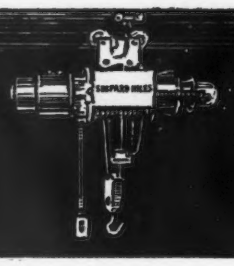


It isn't necessary to work in fractions of a second but it will pay you to check the time it takes to move heavy materials from one spot to another. No matter how efficient you are in operations involving manufacturing, processing or fabricating, there's bound to be a waste of time, money and manpower unless your handling costs are kept down.

Let trained, experienced Shepard Niles engineers assist you in making a study of your handling problems. Over a period of many years America's oldest builder of electric cranes and hoists has assembled data on the handling of materials in thousands of businesses. All this experience is available to you, without obligation, to help you select the crane best suited to do your job with ease, economy and efficiency.

Every hoist application is different. With a background of experience in installing electric hoists in every type of business, Shepard Niles can give you invaluable assistance in planning. This assistance is available without obligation.

Shepard Niles
CRANE & HOIST CORPORATION



356 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

Gallup Polls

(CONTINUED FROM PAGE 111)

about actual tax rates can be seen from another poll by the institute, conducted among a separate but comparable cross-section of voters. Each person was asked how much he thinks a man earning $3000, or $10,000 or $50,000, with two children, now pays in taxes.

From the results it can be seen that people tend to overestimate somewhat the amount paid by a family earning $3000 and to woefully underestimate the tax on the upper brackets.

	What Public Thinks Tax Is Now	What Tax Is Now (Approx)
$ 3,000 Income....	$ 200	$ 131
$10,000 Income....	1,000	1,720
$50,000 Income....	9,000	24,000

The tendency of the public to set taxes at lower rates than those actually existing in the upper brackets has been found over the past 5 years. The nation has been polled since 1942 on what it thinks taxes should be. The trend follows:

	What Public Thinks Taxes Should Be		
	$3,000 Income	$10,000 Income	$50,000 Income
1942	$201	$1,640	$13,700
1943	270	2,000	15,000
1944	150	1,000	12,500
Today	50	900	7,500

•

• • • If army and navy training programs included classroom work that would count as credit toward high school or college diplomas, there is evidence that volunteering would be considerably more popular.

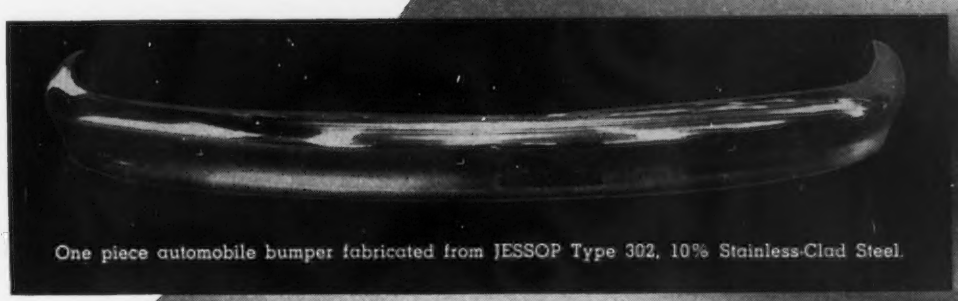
For one thing, more close relatives—parents, brothers, sisters, etc.—say they would then advise the young men in their family to volunteer.

Complaints are coming from many young men in army training camps that much of the work they have to do does not seem useful or constructive; and in some cases there are complaints that they do not have enough to do.

To see what the attitude of the general public is toward the present military training program for young men, the institute has conducted a coast-to-coast poll on

Automobile Bumper Design and Fabrication

advances With ____ Jessop STAINLESS-CLAD STEEL*



One piece automobile bumper fabricated from JESSOP Type 302, 10% Stainless-Clad Steel.

Recently completed trial production runs for the fabrication of JESSOP Stainless-Clad Steel into bumpers, bumper guards, and gravel guards have proved the usefulness of stainless-clad from the standpoints of both production and sales. Production-wise, JESSOP Stainless-Clad parts are easily formed in the same dies used for ordinary steels; sales-wise, JESSOP Stainless-Clad parts will take a beautiful, lustrous finish which will not peel, chip, or flake, and they will remain free of rust or tarnish during the life of the car.

The designer and fabricator of new or redesigned automobile accessories will benefit greatly in today's and tomorrow's competitive market by the many advantages that JESSOP Stainless-Clad Steel has to offer over parts formerly plated or die cast. Our Engineering Service Department will be glad to help you apply Stainless-Clad Steel in the places where it can serve most advantageously. You will find complete information in our catalogue, sent on request.

**Manufactured under U. S. Pat. Nos. 1,997,538; 2,044,742; 2,147,407 and 2,225,862. Can. Pat. No. 383,153.*

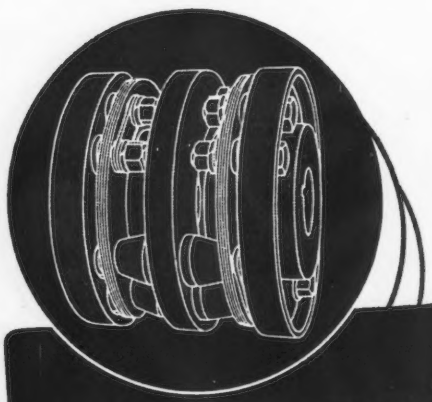
JESSOP STEEL COMPANY
WASHINGTON, PENNSYLVANIA
Tailor-made Specialty Steels

JESSOP Stainless-Clad Steel is made by a patented process whereby stainless steel of uniform thickness is inseparably united to a mild steel backing. Degree of cladding can be varied from 5 to 50%, depending upon the total gauge of the composite metal. Among the many advantages of JESSOP Stainless-Clad Steel are the following:

- A permanent, corrosion resistant surface on the stainless side which will not chip, peel, or flake.
- Mechanical strength supplied by the mild steel backing.
- Easily cold formed in the same dies now being used for other metals.
- Stainless surface is extremely tough and durable. Accidental scratching or gouging is easily repaired.

THOMAS *Flexible* COUPLINGS

are specified by engineers wherever 100% dependability is demanded



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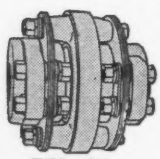

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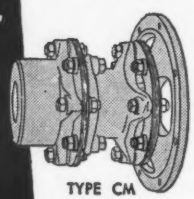

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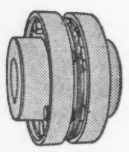
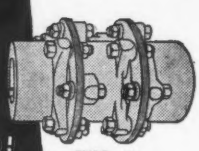


TYPE ST

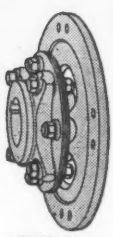


TYPE AM

THOMAS *Flexible* COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float . . . *and Eliminate* BACKLASH, FRICTION, WEAR and CROSS-PULL

NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.



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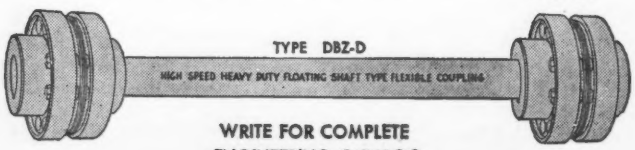


WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

various aspects of the situation.

"If you had a son or brother 18, 19 or 20 years of age, would you advise him to volunteer for service in the Army or Navy for a year?"

The vote:

	Pct
Yes, would advise	53
No, would not	40
No opinion	7

Those who, in answer to a second question said they have a son or brother of that age, voted as follows on the issue of recommending volunteering:

	Pct
Yes, would advise	50
No, would not	45
No opinion	5

Those who said they would not advise a young man to volunteer gave as their chief reason that their education should come first, it is more important.

The extent to which educational training in the service might change people's attitudes can be seen from the results to the next question asked in the poll.

"If the Army and Navy changed their training program to include regular high school or college courses, would you then advise him to volunteer?"

The vote of people who have a son or brother 18-20 years of age:

	Pct
Yes, would advise	64
No, would not	28
No opinion	8

In short, there is a substantial increase in the proportion saying "yes" when the idea of adding educational training to the service is introduced.

There is also general approval of having military authorities try to work out a system whereby educational training in the service would count toward high school or college diplomas.

"Would you be in favor of giving these volunteers enough regular school work in the Army or Navy so that they could earn 1 year of high school or college credit for each year in the service?"

The vote:

	Yes Pct	No Pct	Undec. Pct
All voters	79	12	9
Those with son or brother 18-20	80	13	7

Working out such an arrangement would, of course, involve many difficult problems. Schools and colleges have shown a tendency to be jealous of their own prerogatives in educating young people and have raised objections to the idea of the Army going into

CONTINENTAL KONIK*...

THE FENCE FABRIC WITH A *FUTURE!*

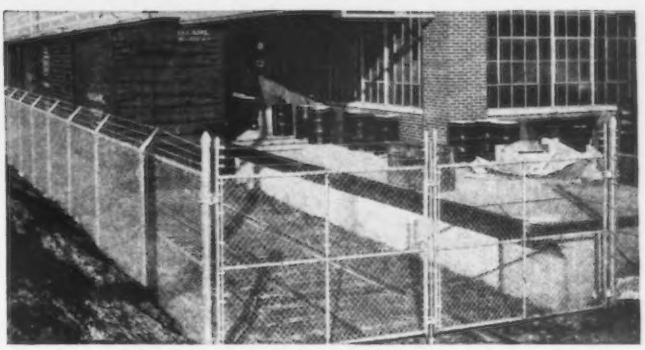
Continental Chain Link fence provides property protection at lower cost through longer fence life. The fabric in this fence is made of KONIK . . . a patented steel containing copper, nickel and chromium. KONIK possesses greater tensile strength and a higher elastic limit and is rust-resistant "clear through."

All this greater strength and rust-resistance . . . all the "clear through" quality of KONIK Steel . . . all these extra values come to you only in Continental Chain Link fence . . . and you get them at no added cost. Ask Continental fence engineers to help with your property protection problems . . . write Continental today.

SEND FOR YOUR FREE COPY

Get a copy of "Planned Protection," a complete manual on modern protection and control of property. Phone the nearest sales office or write—

ENGINEERED FOR PROTECTION



Continental fence has 14 distinctive construction features including heavier line posts . . . stronger and more easily operated gates . . . improved pivot-type hinges . . . self-locking barb arms . . . full gage wire of KONIK steel . . . fastened with 20% more ties.

TAILORED TO FIT YOUR PROPERTY

Experienced fence engineers plan and help erect Continental Chain Link fence. They work with you in laying out the most effective and economical installation to harmonize with the character of property, and to provide the type of protection you need.

★ TRADE MARK REG. U. S. PAT. OFF.

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products

Why Marbott-Fabricated Bases for Die Casting Machines?

Because, each base is designed as an integral part of each machine—a rugged support and a functional unit. The top (above) is divided in four planes at elevations to fit machine contour. There are two access openings to a built-in oil tank, and several accurately located "pads"; some for pump and motor mounts, others serving as "slide rails"—all are important factors in the machine's operation. Underneath (left), it contains an efficient network of reinforcing stiffeners. Inside and out, here's an example of Marbott's close precision craftsmanship in heavy steel plate . . . and another *good* reason for specifying Marbott for *your* fabrications.

MARBOTT FOR SPEED

THE Marbott WELD COMPANY

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TWO JOBS IN ONE!

with "GRAND RAPIDS" combination tap and drill grinders

AT LESS COST
IN LESS TIME
IN LESS SPACE

Gallmeyer & Livingston's GRAND RAPIDS Combination Tap and Drill Grinder is the only machine of its type. All of the advantages of the Grand Rapids Twist Drill Grinder and the Grand Rapids Tap Grinder are combined in this one machine. You save three ways by investing in this machine: On first cost, on lower maintenance expense and on valuable floor space.

Write for Bulletin G.L. 8-46

SPECIFICATIONS

Capacity (drill) 1/8" to 1 1/2"
Capacity (tap) No. 6 to 1 1/2"
Spindle Speed 1725 R.P.M.
Dia. Grind. Wheels 10 1/2" and 12"
Motor 1 H.P.

GRAND RAPIDS
GALLMEYER & LIVINGSTON CO.

What "GRAND RAPIDS" Quality Means: Gallmeyer & Livingston cast their close-grained gray iron, machine to micrometric tolerances, precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means *top* quality in grinding machinery.

GALLMEYER & LIVINGSTON COMPANY, 200 Straight St., S. W., Grand Rapids 4, Mich.

the business of general education. Army authorities, too, have raised questions as to whether it is the proper function of the Army to give the young men anything beyond basic drill, familiarity with weapons, and enough technical training to make them soldiers.

But the recent survey shows that the general idea of more education in the Army does have wide popular appeal and would undoubtedly meet with a favorable reception from public opinion as a whole.

London Economist

(CONTINUED FROM PAGE 117)

MR. ANDREWS adds a few cupolas of his own to the remarkable structure of the agreement which conceals so many disagreements. He proposes to set up within the Armed Forces Committee a series of subcommittees of which he himself will be an exofficio member, along with Mr. Vinson, the senior Democratic member. These subcommittees will deal with such subjects as (his words) aviation, heavy ordnance, and personnel. They will have their own staffs of independent experts, connected neither with Army nor Navy, and the liaison officers from those departments will be "just that," which apparently means gilded messenger-boys.

There is a good deal of opinion, even in the tightest Army circles, that heavy ordnance in land warfare has become obsolete. Its mission is long-range fire, and it moves too slowly, offers far too attractive a target for minor weapons, to serve effectively in this capacity. Heavy ordnance at sea is in a far different position. It is mounted on an active platform and can obtain surprise.

For that matter, how heavy is heavy? The Army considers a 155-mm gun as heavy; it is almost exactly the calibre of the 6-in. gun which is the standard light weapon of naval war. The conclusions seem unavoidable that the new Congress has not studied the question at all; that the military departments have studied it, and have reached an agreement, not to agree, but to continue the debate behind the scenes, where beneath a surface appearance of accord, they can continue the process of playing for position as grand masters do in modern chess.

FEATURE CONTINUATION

Determination of Titanium Nitride in Ferroalloys

(CONTINUED FROM PAGE 68)

heavy fumes of perchloric acid. If the solution is colorless (indicating an absence of chromium), add 100 ml of 5 pct sulfuric acid, boil out chlorine fumes, and cool to room temperature. To this solution add 5 ml of 3 pct hydrogen peroxide. The resulting solution can then be compared with a titanium standard solution prepared from Bureau of Standards sample No. 121a by cupferron[3] or by the cold perchloric acid method[4]. Should the solution be yellow or red (chromium present) in color, the cold perchloric acid method is suggested.

If neither TiO_2 nor TiC were detected in the X-ray diffraction pattern, the determination may be considered quantitative for TiN by calculating Ti to TiN.

To obtain a quantitative determination for the nitrogen content in the residue, the sample is treated as described in the first paragraph under *Procedure*. The paper and contents are then transferred to a Kjeldahl flask and the analysis completed as usual for nitrogen in steel[5].

Results

Samples were prepared according to the procedure outlined and the residues analyzed by X-ray diffraction methods. The results obtained are listed in table II.

In TiN the first five principal planes are (1, 1, 1), (2, 0, 0), (2, 2, 0), (3, 1, 1), and (2, 2, 2); the a_0 (length of one side of lattice) value is 4.30A°. For No. 47 alloy, the a_0 value was found to be 4.36A while Hume-Rothery[6] reported 4.23A.

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[1] Silverman, Louis, Ind. Eng. Chem. Anal. Ed., 7205 (1935).
[2] ASTM card index, X-ray Diffraction, first and second supplements.
[3] Silverman, Louis, Chemist-Analyst, 23, 3, p. 4 (1934).
[4] Silverman, Louis, Ind. Eng. Chem. Anal. Ed., 14, 791, (1942).
[5] Redmond, Gerst and Touhey, Ind. Eng. Chem. Anal. Ed., 18, 24, (1946).
[6] Hume-Rothery, Raynor and Little, Journ. Iron & Steel Inst., 145, 129, (1942).

British Raise Castings

• • • **The British Minister** of Supply has recently announced increases in maximum prices for steel castings, chain link fencing and mattress wire. Castings go up by about 8 pct and chain link fencing by 2½ pct.

THERE'S PLENTY OF ROOM IN THE BALCONY!

"Main floor" storage is expensive — especially when overhead storage space is wasted. In many operations, outmoded handling methods prevent full utilization of the existing storage area. In many other operations, Towmotor Fork Lift Trucks have doubled, even tripled, storage capacity through high stacking of materials and products.

Let Towmotor show you how to "pack the house," convert waste space into profitable warehouse space. First step? Send for a Pocket Catalog describing the complete line of Towmotor Fork Lift Trucks and Accessories.

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FORK LIFT TRUCKS *and* TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

(*Continued from page 72*)

Nicorros: Highly corrosion-resistant 67-33 Ni-Cu alloy for chemical and oil apparatus and ship construction. Vereinigte Deutsche Nickelwerke A.G., Schwerte, Ruhr, Germany.

Nicral: Al alloys with Ni, Cr, Cu, Mg for high strength light alloy parts, extruded shapes. Nicralumin Co., Jackson, Mich.

Nicral: Corrosion-resistant 20 Cr stainless for boiler parts, domestic utensils. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. V. Ferner Co., Investment Bldg., Washington.

Nicrosilal: Heat-resistant austenitic 18 Ni, 6 Si, 2 Cr, 1 Mn cast iron for furnace grids, regenerator boxes, annealing pots. Mond Nickel Co., Ltd., London, England.

Nicuite: Ni-bearing bronze for heavy loads and slow speed bearings. A. W. Cadman Mfg. Co., 2816 Smallman St., Pittsburgh.

Nielco Lab. 1167: Cleaner especially effective for removing oil, zinc, chromate and lacquer from aluminum. Nielco Laboratories, Bellevue & Benson Sts. Detroit 7.

NI-Hard: Extremely hard, nckel-chromium cast iron having exceptional resistance to abrasive wear combined with toughness and strength. International Nickel Co., Inc., 67 Wall St., New York 5.

Nikro: Steel for collets, races, arbors, gears. Vanadium-Alloys Steel Co., Latrobe, Pa.

Nikrome: A 1.5 Ni-0.8 Cr alloy steel for drive shafts, axles, spindles, pins. Joseph T. Ryerson & Son, Inc., Rockwell and 16th Sts., Chicago 80.

Nilson: Cold-heading tools and dies. Nilson Tool & Mfg. Co., 11343 Shaefer, Detroit 27.

Nilstain: Corrosion-resistant steel for stainless parts, springs. Wilbur B. Driver Co., Newark, N. J.

Nilvar: Fe-Ni alloy of the invar type; for thermostats and metal-to-glass seals. Driver-Harris Co., Harrison, N. J.

Nimol: See Ni-Resist.

9H Nickel Anodes: Cast, rolled carbon and rolled depolarized nickel anodes containing 1 pct cobalt. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Nipermag: Permanent-magnet alloy containing 12 aluminum, 32 nickel, 0.4 titanum and iron. Arnold Engineering Co., 147 E. Ontario St., Chicago 11.

Nipermag: Permanent magnet steel for loud speakers, motors, generators. Cinaudagraph Corp., Stamford, Conn.

NI-Resist: Corrosion or heat-resistant alloy cast iron, non-magnetic and readily machinable. International Nickel Co., Inc., 67 Wall St., New York 5.

Niresist: High nickel-copper iron alloy with Cr, for heat and corrosion-resistant parts. Bonney-Floyd Co., 613 Marion Road, Columbus, Ohio.

Ni-Resist: Highly-alloyed austenitic cast iron with about 13 Ni, Cu-Cr-Si-Mn for pipes, valves, pumps, pistons, sleeves. International Nickel Co., Inc., 73 Wall St., New York. Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Niresult: High-chrome 13 Ni, 6 Cu stainless steel, for heat and corrosion-resistant parts. Michigan Steel Casting Co., 2001 Guoin St. at Corfield, Detroit.

Nirex: Stainless, Ni-Cr-Fe alloy for heat resisting parts. Driver-Harris Co., Harrison, N. J.

Ni-Rod: Welding electrode for making welds of high machinability in cast iron. International Nickel Co., Inc., 67 Wall St., New York 5.

Nironite: Heavy duty iron alloy for rolls for strip mills. Mackintosh-Hemphill Co., Pittsburgh.

Nirosta: Series of austenitic stainless steels for cutlery, pipe fittings, shafts, corrosion resistant articles, sulphuric acid tanks. Fried. Krupp, A. G. Essen, Germany; Standard Alloy Co., Inc., 1679 Collamer Ave., Cleveland; Michiana Products Corp., Route 12, Michigan City, Ind.

Nirostaguss: Corrosion-resistant high-chrome high-carbon steel castings for chemical, pulp and nitric acid industries. Fried. Krupp A. G., Essen, Germany.

Ni-Span: Group of age-hardenable, iron-nickel-titanium alloys of the Invar and Elinvar types, but can be fabricated easily. International Nickel Co., Huntington, W. Va.

NI-Tensyliron: High-strength, machinable nickel cast iron, having tensile strength of 50,000 psi. International Nickel Co., Inc., 67 Wall St., New York 5.

Nitralloy: Aluminum-bearing alloy steels with Mo-Cr, for nitrided parts. Vanadium Alloys Steel Co., Latrobe, Pa.

Nitralloy: Various grades alloy steel containing aluminum; can be nitrided without final quenching; used where machining and physical properties are desired. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22.

Nitralloy: Special alloy steel intended for nitride process of finished parts requiring extreme surface hardness. Joseph T. Ryerson & Son, Inc., Box 8002-A, Chicago 80.

Nitrigage: Plain and thread plugs and rings. Sheffield Corp., Box 893, Dayton 1.

Nitrosa Steel: 18-8 Cr-Ni stainless steel for general applications and chemical apparatus. Firth-Sterling Steel Co., McKeesport, Pa.

Nitrose: One-coat compound to protect metal surfaces against weather, alkalis, acid fumes and high temperatures. Nitrose Co., Inc., Peoria 2, Ill.

Nittany: 62 Cu brass with 3 Pb for screw machine parts. Titan Metal Mfg. Co., Sieg & Craig Sts., Bellefonte, Pa.

Nivarox: Elinvar-type iron alloy with W, Mo, Be, for general use. Heraeus-Vacuumschmelze A. G., Hanau, Germany.

Noblewest: Industrial marking machines and equipment; graduating machines; numbering heads; steel marking dies and stamps. Noble & Westbrook Mfg. Co., East Hartford, Conn.

No-Carb: Brushing or spraying compound to prevent undesired carburization and decarburization of steel. Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England.

Nocorodal: Heating coils and exchangers made principally of impervious carbon for chemical resistance. Heil Engineering Co., 12901 Elmwood Ave., Cleveland 11.

Noelting-Faultless: Truck casters. Faultless Caster Corp., Evansville 7, Ind.

No-Gald: Cold-heading steel wire for closed and open die work. Youngstown Sheet & Tube Co., Youngstown.

Nogas: Amorphous brown powder, soluble in water and acids, used as an addition agent in the acid pickling of iron and steel to produce a foam blanket. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Nogroth: Complex alloy cast iron for pump liners, pistons, valves. Q & C Co., West St. Bldg., New York.

Noheet: Lead with sodium, antimony and tin for bearings. Ardal Ltd., Worle, Weston-Super-Mare, England.

Noil: 20-80 bronze for piston rings. Baker, Perkins & Co., Ltd., Peterboreugh, England.

No-Kase: Brushing or spraying compound for selective carburization in liquid baths. Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England.

No-Kor-O: Complete series of stainless steels for chemical equipment, tubes, valve parts, pump rods, cutlery. Canadian Atlas Steels, Ltd., Welland, Ont., Canada.

No-Leak: Apron conveyors. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Nomag: Austenitic cast iron with 10 Ni, 6 Mn for electrical constructions, switch covers, resistance grids. Ferranti, Ltd., Lancashire, England.

Non-Corrodite No. 25: Cr stainless for castings and corrosion resisting parts. Millbury Foundry Co., Millbury, Mass.

Non-Dulling: Special solder for stainless steel. L. B. Allen Co., 6761 Bryn Mawr Ave., Chicago.

Non-Fluid Oil: Oil for ball and roller bearings. New York & New Jersey Lubricant Co., 290 Madison Ave., New York 17.

Nonfray: Bias-type buff, either ventilated or non-ventilated. F. L. & J. C. Codman Co., Rockland, Mass.

Non-Gran: Copper-tin-zinc bearing bronze centrifugally or sand cast. American Non-Gran Bronze Co., Berwyn, Pa.

Non-Leak: Roofing nails. Bethlehem Steel Co., Bethlehem.

Non-Pareil: Lead-antimony-tin anti-friction metal for bearings and solders. Theodore Hiertz Metal Co., Alaska & Tesson St., St. Louis.

Non-Ridge: Polishing wheels. Bruce Products Corp., 5712 12th St., Detroit 8.

Nonscratch: Lubricants for drawing and stamping operations on various metals, pigmented and non-pigmented, oil and water-soluble compounds. Wayne Chemical Products Co., Detroit 17.

Nonslip: Sheet material, single application of which eliminates belt slippage for periods up to two years. Nonslip Pulley Covering Co., Buffalo.

Nonsulite: 28-8 Cr-Ni stainless for heat and corrosion-resistant parts. Michiana Products Corp., Route 12, Michigan City, Ind.

No-Per-Vex: Wear-resistant floor seal. Tureo Products, Inc., Los Angeles 54.

10,000 TRADE NAMES

No-Plug: Industrial truck controllers. Baker-Raulang Co., 2168 W. 25th St., Cleveland 13.

Noral: Diecasting aluminum alloy. Northern Aluminum Co., Ltd., Bonbury, Oxon, England.

Norbide: Boron-carbide (B4C) abrasive grain, and molded products such as blast nozzles, gage blanks, wire-drawing dies, etc. Norton Co., Worcester 6.

Norbide: Special carbide crucible material for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norblack: Special lampblack used in high-frequency induction furnaces for heat insulation at high temperatures. Ajax Electrothermic Corp., Trenton, N. J.

Norca: Mineral-bonded sheet mica used for electrical insulation principally in converter operated high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norcast: Refractory cement used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norcon: Zircon sand used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norconeff: Zircon powder used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norconite: Zircon sand and zircon powder mixture used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norflex: Abrasive wheels for polishing and deburring. Norton Co., Worcester 6.

Norlun: Refractory cement used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Normagal: Mixture of magnesia and alumina used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Normalloy: Mn-Cr-V alloy steel for crankshafts. Vanadium Corp. of America, Bridgeville, Pa.

Normanna: Alloy steel. Swedish American Steel Corp., 429 Kent Ave., Brooklyn.

Normolith: Refractory cement used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norpatch: Refractory cement used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norsand: Silica sand used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Norsil: Powdered silica used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

Northrup: High-frequency induction furnace for melting, heating, hardening, surface hardening, etc. Ajax Electrothermic Corp., Trenton, N. J.

Norton: Grinding and lapping machines. Norton Co. Worcester 6.

UNION INDEXING CHUCKS

reduce labor, machine time and fixture costs

Many plants are using Union Indexing Chucks to eliminate multiple handling of work that has more than one face or opening to be machined. They save time, machines, manpower and money in faster production of scores of products ranging from pipe fittings to airplane fuselage and engine parts.

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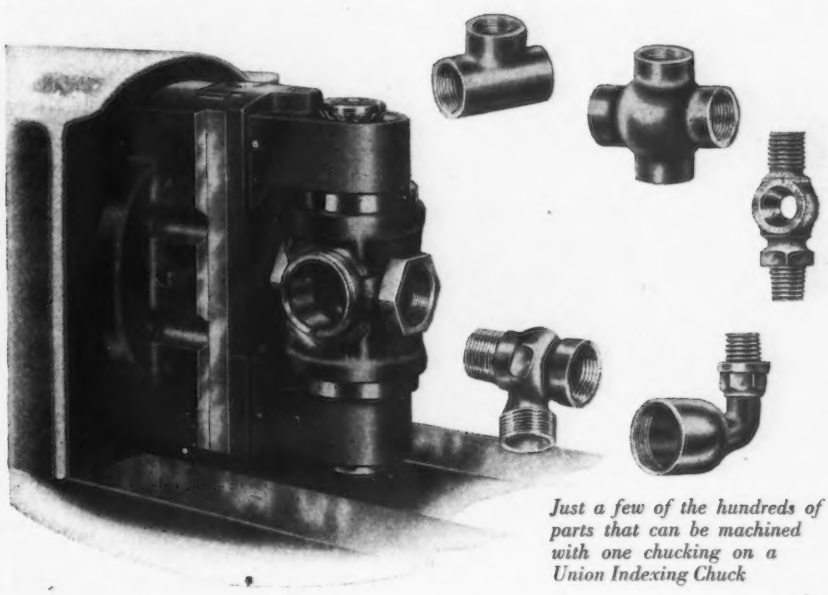

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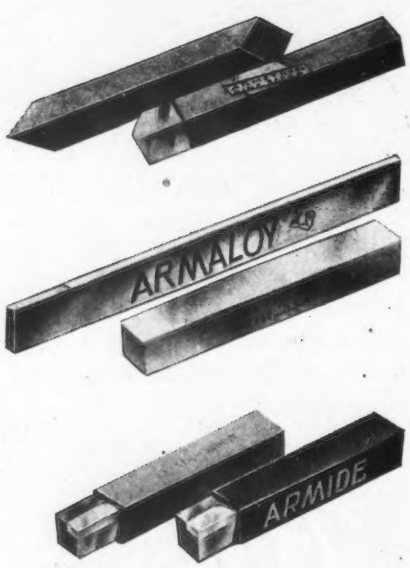

ARMSTRONG BROS. TOOL CO.
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309 N. Francisco Ave. Chicago, U. S. A.
Eastern Warehouse & Sales: 199 Lafayette St., New York

10,000 TRADE NAMES

Norton Abrasives: Boron-carbide products, nonslip tile and aggregates. Norton Co., Worcester 6.

Northern: Heavy-duty cranes, transfer cranes, electric hoists, air hoists, etc. Northern Engineering Works, 2725 Atwater St., Detroit 7.

Nervit: Refractory cement used as a lining element for high-frequency induction furnaces. Ajax Electrothermic Corp., Trenton, N. J.

No-Scale: Liquid paste to prevent formation of excessive scale on high-alloy steels, die blocks, forgings. Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England.

Nosep: Oily compound containing suspended sulphur for use in pump circulating machines for tapping, threading, drilling, boring, cutting, reaming, etc. Wayne Chemical Products Co. Detroit 17.

No-Thread: Compression couplings. Dresser Mfg. Div., Bradford, Pa.

No-Tride: Liquid paint for selective nitriding in ammonia atmospheres. Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England.

No-Vein: Foundry mold and parting compounds. Independent Foundry Supply Co., 2325 E. 38th St., Los Angeles 11.

Novite: Cast iron with 1.5 Ni, for impellers, cylinder heads, water pumps. Novo Engine Co., Lansing, Mich.

Noviweld Glass: Chemically compounded welding glass to give maximum protection against ultra-violet and infra-red radiations. Five shades for goggle lenses and seven for welding plates. American Optical Co., Southbridge, Mass.

Noviweld-Didymium Lenses: Chemically compounded welding lens to give maximum protection against ultra-violet and infra-red radiations, and to absorb sodium flare. American Optical Co., Southbridge, Mass.

No-Wear: Gas welding rod for hard facing. Callite Tungsten Corp., Union City, N. J.

Nox-Rust: Rust preventive products for all phases of the metalworking industry, comprising grease, oil and solvent type petroleum derived products for all methods of applications and degrees of exposure. Nox-Rust Chemical Corp., 2429 S. Halsted St., Chicago 8.

NS: Precision steel wire; wire braids, flat and tubular in steel or other metal; cold-rolled steel strip. National-Standard Co., Niles, Mich.

Nubon: Precision grinding wheels and sharpening stones. Universal Wheel & Abrasive Corp., 400 N. Ashland Ave., Chicago 22.

Nu-Blast: Ground walnut shells used for soft grit blasting of cylinder walls and machine parts. Nu-Blast Co., 3301 E. Vernon Ave., Los Angeles 11.

Nu-Braze No. 4: Silver brazing alloy for ferrous and nonferrous metals. Sherman & Co., 197 Canal St., New York.

Nucast Nickel Anodes: Cast anodes containing 99.7 pct nickel. Apothecaries Hall Co., Waterbury, Conn.

Nuciting: Method of treating high-speed steel which is supposed to give extreme toughness

at high hardnesses. Nucite Process Co., Warsaw, Ind.

Nueral: High-silicon aluminum alloy with Cu-Ni, for cylinder heads. Aluminiumwerke Nurnberg G.m.b.H., Nurnberg, Germany.

Nugent: Oil filters, oiling systems, oil filtering systems, etc. Wm. W. Nugent & Co., Inc., 410 N. Hermitage Ave., Chicago 22.

Nuglu: Cold glue in liquid form used mostly for recoating, polishing or buffing wheels; requires no cooking. J. J. Siefen Co., 5657 Lauderdale Ave., Detroit.

Nukem Monolithic Brick: Brick shapes used to construct acid-proof tanks where thermal and mechanical shocks are severe. Nukem Products Corp., 122 Colgate Ave., Buffalo 20.

Nukem Resinous Cement: Acid and alkali-proof resin-base cement for jointing acid brick or tile in construction of floors, sewers, tanks, etc., for temperatures up to 350°F. Nukem Products Corp., 122 Colgate Ave., Buffalo 20.

Nukemite: Protective plastic coating possessing extreme resistance to strong acids, alkalies and solvents and to severest outside exposures for any surface. Nukem Products Corp., 122 Colgate Ave., Buffalo 20.

Nu-Looks: All-plastic lightweight goggle. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Nuloy: Low-alloy steel with Mn-Si; for castings, gears. Sivyer Steel Casting Co., 1677 S. 43rd St., Milwaukee.

Numastic: Special asphalt cement used as flexible, impervious membrane in construction of acid tanks, sewers, floors, etc. Nukem Products Corp., 122 Colgate Ave., Buffalo 20.

No. 40: Series of high-strength aluminum alloys for structural and decorative uses; take a high polish and have good resistance to corrosion. Frontier Bronze Co., Elmwood Ave., Niagara Falls, N. Y.

No. 73 Hot Work: Fe-Cr welding electrode. Welding Equipment & Supply Co., 223 Leib St., Detroit.

No. 75X Water Hardening: Water-hardening iron welding electrode. Welding Equipment and Supply Co., 223 Leib St., Detroit.

No. 426 Alloy: High coercive force iron alloy for permanent magnets. General Electric Co., Schenectady.

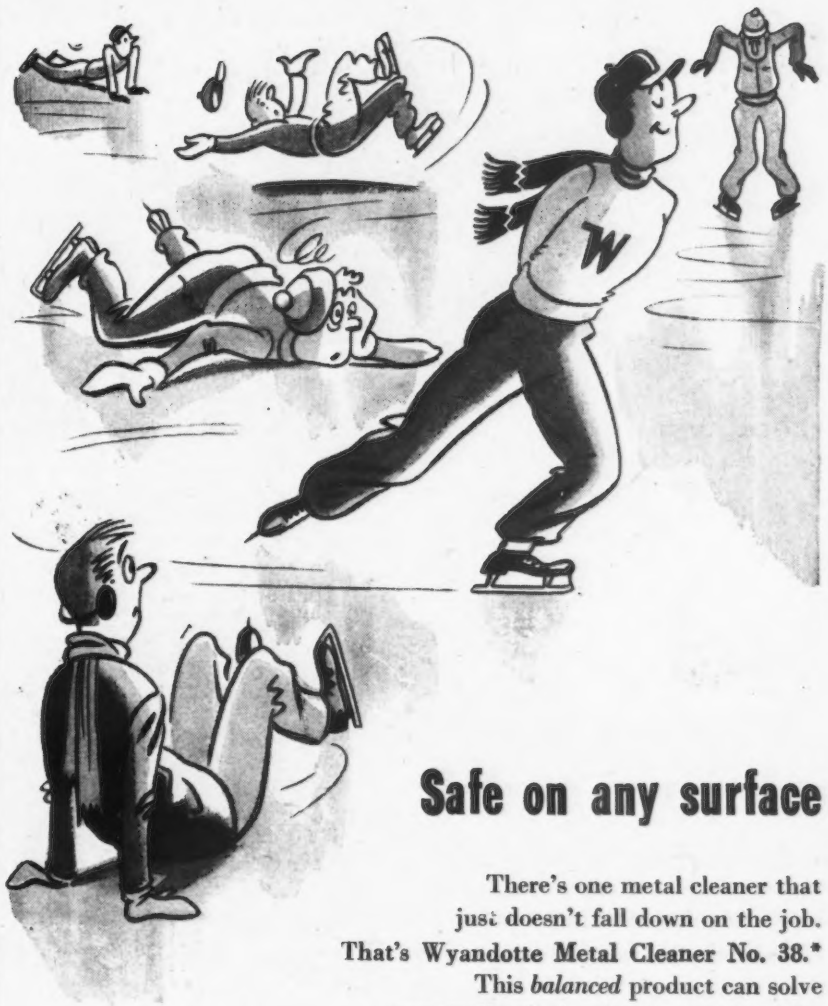
Nural: Aluminum alloy with 10 Mg, Si-Mn, for light-alloy parts. Aluminiumwerke Nurnberg G.m.b.H., Nurnberg, Germany.

Nurex: Corrosion and abrasion resisting iron alloy for mill balls, linings. National Malleable & Steel Castings Co., 10600 Quincy St., Cleveland.

Nurox: Air or electric-furnace iron. National Malleable & Steel Co., Quincy & Reservoir Aves., Cleveland, Ohio.

Nusite: Hardening of high-speed steels, using a heat cycle said to give higher hardness and greater toughness. Perfection Tool & Metal Heat Treating Co., 1740 W. Hubbard St., Chicago 22.

Nusite: A 13 pct cobalt steel, subjected to a sequence of low and high-temperature heat



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Wyandotte Metal Cleaner No. 38 is all-soluble. It dissolves quickly, rinses easily and completely. It is designed to correct water conditions . . . wet rapidly . . . give long life in solution. It is inhibited to prevent corrosion of the metal being treated.

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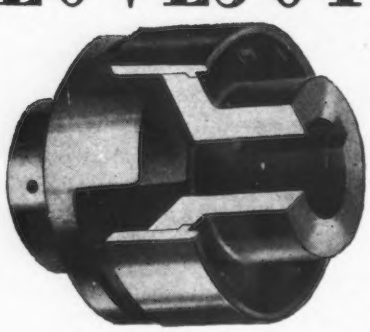

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treatments. Hardness Rc 67. Nusite Steel Process Co., Warsaw, Ind.

Nu-Spra-Glu: Nuglu (liquid cold glue) and aluminum-oxide grain which can be sprayed directly to a revolving polishing wheel or buffing wheel produced satin finish. J. J. Siefen Co., 5657 Lauderdale Ave., Detroit.

NX Gas: Prepared gas atmosphere for bright annealing medium and high-carbon steel and nonferrous metals. Surface Combustion Corp., Toledo 1.

O

OFHC: Oxygen-free high-conductivity copper. American Metal Co., Ltd., 61 Broadway, New York.

O.F.H.C. Copper: Oxygen-free high-conductivity copper with 99.98 Cu, for electrical equipment. United States Metals Refining Co., Middlesex Ave., Carteret, N. J.

O H 38: Non-heat-treated aluminum alloy primarily for consumer products. Oscar W. Hedstrom Corp., 4844 W. Division St., Chicago 51.

Oakite No. 90: Fast action alkaline cleaner for cleaning steel parts, such as aircraft forgings, control instrument parts, gun mechanisms, before finishing. Oakite Products Inc., 48-A Thames St., New York 6.

Oakite Pickle Control: Used to inhibit sulfuric acid employed in production pickling; minimizes attack on sound metal, saves acid, reduces fumes. Oakite Products, Inc., 30H Thames St., New York 6.

Ohio: Industrial and automotive lubricants including both greases and oils. Ohio Grease Co., Loudonville, Ohio.

Ohio Woodland: Fire brick. Robinson Clay Products Co., Akron 9, Ohio.

Ohiohm: Composition and wire-wound resistors for radio, television, communication and a variety of electronic applications. Ohio Carbon Co., 12508 Berea Rd., Cleveland.

Ohmaloy: Moderately magnetic steel alloy, ductile, high electrical resistivity, oxidation resistant at high temperatures. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Ohmaloy: 13 Cr, 4 Al steel for resistance wire, rheostats. Wilbur B. Driver Co., Newark, N. J.

Ohmax: Heat-resistant 20 Cr, 8.5 Al iron alloy for electrical resistances. Driver-Harris Co., Harrison, N. J.

Ohmoid: Laminated phenolic plastic similar to Bakelite in sheets, rods, and tubes. Wilmington Fibre Specialty Co., Wilmington, Del.

Oilfreair: Air compressors and vacuum pumps. Pennsylvania Pump & Compressor Co., Easton, Pa.

Oilgear: Fluid power pumps, motor, transmissions, cylinders, valves, broaching machines, presses and accessories. Oilgear Co., Milwaukee 4.

Oilite: Self-lubricating bearings and machine parts made from powdered metals. Chrysler Corp., Amplex Div., P. O. Box 2718, Detroit 31.

Oilostatic: Insulated electrical cables in welded

steel pipe under oil pressure. Okonite Co., Passaic, N. J.

Olympic: Corrosion-resistant silicon bronzes for structural, engineering, hot forging, cold heading and other cold working operations. Chase Brass & Copper Co., Inc., Waterbury 91, Conn.

Okalite-Okoprene: Neoprene-covered electrical cables. Okonite Co., Passaic, N. J.

Old Genuine Babbitt: 89 Sn, Sb-Cu for bearings. Lumen Bearing Co., 199 Lathrop St., Buffalo 12.

Oldsmoloy: White bronze for gears, bearings, etc. High shock strength, corrosion and abrasion resistance. Olds Alloys Co., South Gate, Calif.

Olivine: Basic openhearth refractory. E. I. du Pont de Nemours & Co., 350 Fifth Ave., New York.

Olsen: Testing and balancing machines. Tinius Olsen Testing Machine Co., 510 N. 12th St., Philadelphia 23.

Olympic Bronze: Brasses with P, Si for screw-machine parts, hardware, hinges, sheathing. Lumen Bearing Co., 199 Lathrop St., Buffalo.

Omanitbronze: Copper alloy with 10 Al, Ni-Fe; for valve gage fittings. Ostermann & Co., Metallwerke, Cologne, Germany.

Omega Brand Phosphor Bronze: Corrosion resistant bronze with 5 Sn and 0.2 P: for hardware, springs, wire rope. Riverside Metal Co., Riverside, N. J.

Onival: Basic refractory brick made of low iron periclase bonded with Forsterite. E. J. Lavino & Co., 1528 Walnut St., Philadelphia 2.

Onx: Refractory cement for furnace firebrick. A. L. Curtis & Co., Chatteris, England.

Optimus: Low-voltage electroplating generators; abrasives. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Optimus Oils: For steam cylinder lubrication. Cities Service Oil Co., 70 Pine St., New York 5.

Opto-Matic: Constant level oiler. Trico Fuse Mfg. Co., 5th and Chambers St., Milwaukee 12.

Oralloy: A silver alloy for dentures. Precious Metals Research Works, Inc., 230 W. 41 St., New York.

Orange-Stripe: Garnet papers and cloths. Clover Mfg. Co., Norwalk, Conn.

Orange Tip: See Yellow Tip.

Oranium Bronze: Copper-aluminum alloy with 10 Al, for castings. Bridgeport Brass Co., Bridgeport, Conn.

Oreide: Copper alloy with 7-33 Zn, 2-7 Ni, for hardware and ornamental parts. Vereinigte Deutsche Nickelwerke A. G., Schwerte, Ruhr, Germany.

Oreide: Corrosion resisting brass for bearings, jewelry. Scovill Mfg. Co., Waterbury, Conn.

Orion: Low-alloy Cr-V steel to resist heavy vibrations in machine parts, tools, springs, gears, dies. Universal-Cyclops Steel Corp., Bridgeville, Pa.

Orrweld: Electric and acetylene welding rods

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and supplies. William M. Orr Co., 1228 Brighton Rd., Pittsburgh 12.

Orthosil: See Pennsalt.

Osborn: Complete line of industrial brushes, both power driven and maintenance. Also, foundry molding machines and core blowers. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Ostermann: Series of bronzes of various types for bearings, fittings, wire, machine construction. Ostermann & Co., Metallwerke, Cologne, Germany.

Otiscoloy: 0.12 C, 1 to 1.35 Mn, 0.10 to 0.14 P, 0.50 Cu high-tensile steel with good weldability and corrosion resistance; for structural applications on mobile equipment, auto frames, railroad cars, trucks, etc. Jones & Laughlin Steel Corp., Pittsburgh.

Otiscoloy: Mn-Cu-Ni-Cr steel for deep-drawn parts. Otis Steel Co., Union Commerce Bldg., Cleveland.

Otisel: Series of stainless steels for corrosion and heat-resistant parts. Otis Elevator Co., Buffalo.

Ounce Metal: Special brass with 5 Sn, 5 Zn, 5 Pb for bearings, valves, carburetor and pump parts. Alloys & Products, Inc., Oak Point Ave. & Barry St., New York.

Overway: Trolley and I-beam conveying systems. Richards-Wilcox Mfg. Co., Aurora, Ill.

Owan: Pb-Cu for self-lubricating bearings. Woodworkers Tool Works, 222 S. Jefferson Ave., Chicago.

Owen: Scrap grapples, crane buckets for coal, coke, etc. Owen Bucket Co., 6011 Breakwater Ave., Cleveland.

Ox-Al-Ite: Metal and glass reflectors and shades for lighting fixtures. Wiremold Co., Hartford 10.

Oxaluma: Aluminum oxide grinding wheels for steel and metals having high tensile strength. Cortland Grinding Wheels Corp., Chester, Mass.

Oxidine: Chemical baths to produce a black finish on brass, copper, zinc and zinc diecastings. Alrose Chemical Co., Box 1294, Providence 1, R. I.

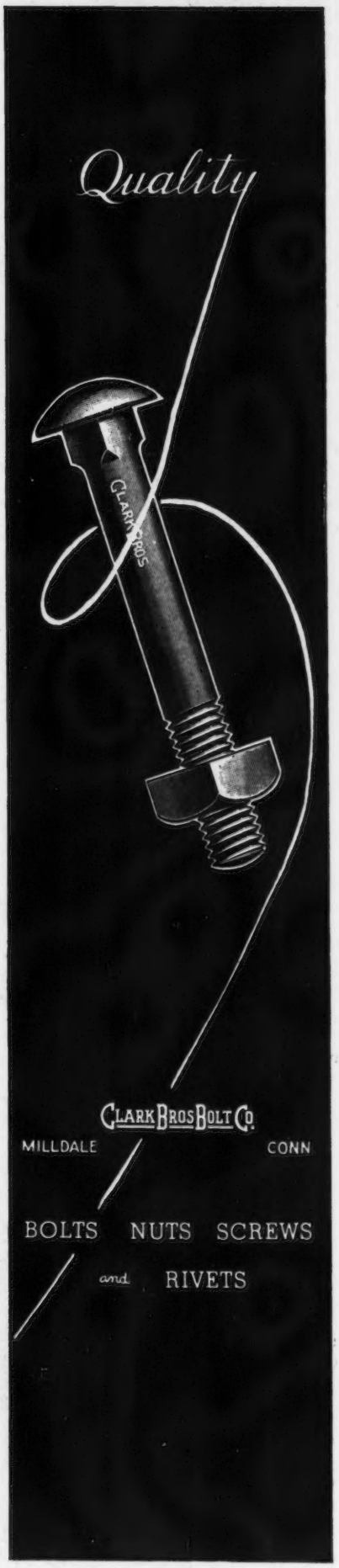
Oxolin: Oleo resinous coatings for the protection of welded pipe from corrosion; also, transparent, water white lacquer for the protection of galvanized products. Ball Chemical Co., Fulton Bldg., Pittsburgh 22.

Oxweld: Pressure-welding machines; oxyacetylene cutting machines; welding, cutting, heating, and treating blowpipes; oxygen, acetylene, hydrogen, carbon dioxide, and fuel gas regulators; welding rods, fluxes, wrenches, hose, goggles, gloves, and cylinder trucks. Linde Air Products Co., 30 E. 42nd St., New York 17.

Oxweld Nozzle Cleaner: Cleaning compound which loosens slag and carbon deposits in oxyacetylene welding and cutting nozzle tip orifices. Apparatus Div., Union Carbide & Carbon Corp., 32 East 42nd St., New York 17.

Oxyarc: Hollow-electrode cutting torch through which oxygen flows; cuts stainless steel, etc. Arcos Corp., 1515 Locust St., Philadelphia.

Oxy-Dyz-Ene: Oxidizing agents for electroplat-



ing baths. Krembs & Co., 669 W. Ohio St., Chicago.

Oxygraph: See Airco.

Ozalid: Reproduction machine for translucent tracings; five colors available. Ozalid Div., Johnson City, N. Y.

P

P & H Smootharc: Steel welding rod. Harnischfeger Corp., 4400 W. National Ave., Milwaukee.

Pacemaker: Lathes. American Tool Works Co., Alter & Hussey Sts., Cincinnati.

Pacemaker Oils: For the lubrication of diesel engines, turbines and compressors. Cities Service Oil Cos., 70 Pine St., New York 5.

Package: Sewage treatment plants for small communities and industrial plants produce a sparkling clear effluent without odor or fly nuisance. Chicago Pump Co., 2300 Wolfram St., Chicago 18.

Packer-Matic: Automatic polishing and buffing machines. Packer Machine Co., Meriden, Conn.

Pacz: Process for applying a colored protective film on aluminum and aluminum alloys. Aluminum Co. of America, Pittsburgh; Reynolds Metals Co., Louisville.

Page: Series of Fe-alloys for welding and hard facing electrodes. Page Steel & Wire Div., American Chain & Cable Co., Monessen, Pa.

Page-Allegheny: Stainless steel electrodes. Page Steel & Wire Div., American Chain & Cable Co., Inc., Bridgeport, Conn.

Page B-Special: Arcwelding electrode for steel; corresponds to AWS E-4510. Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Paintbond: Galvanized, bonderized steel sheet that permits immediate painting with excellent adherence. Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30.

Painteil: Oil paint made in the form of a crayon; for marking hot or cold surfaces. Helmer-Staley, Inc., 325 W. Huron St., Chicago.

Paintgrip: Galvanized steel sheet with special Bonderized surface as a base for paint. American Rolling Mill Co., 1941 Armco Ave., Middletown, Ohio.

Paint Sticks: Paint solidified into stick form for marking hot or cold, wet or dry, or oily surfaces of metal, wood, plastics, etc. Markal Co., 607 N. Western Ave., Chicago 12.

Paintite: For preparing metal for painting. Turco Products, Inc., Los Angeles 54.

Paintstik: Solid paint sticks for marking on hot or cold surfaces. Markal Co., 629 N. Western Ave., Chicago 12.

Paliney: Two types of Pd, Pt, Ag, Cu, Ni alloys which are heat treatable and non-magnetic; for pivots, springs, electrical contacts, bearings. J. M. Ney Co., 9 Elm St., Hartford.

The Hartford 28 Machine, manufactured by the Hartford-Empire Company, is an economical producer of seamless tumblers. On this and similar machines, Ampco Metal is used for bushings, bearings, gears, glands, brackets, sprocket levers, and cam rolls.

A machine needs *guts to make a tumbler**

Wear-resistant Ampco Metal protects glass-making machines against production-interrupting breakdowns

*"The manufacture of glass containers requires more from a machine than any other automatic production process," according to engineers at the Hartford Empire Company, Hartford, Conn., leading producer of glass-making machinery. "Equipment must run 24 hours-a-day, month after month except for mold and job changes. Add high temperatures, constant vibration and stress . . . and you have the ever-present threat of a machine breakdown.

"We use Ampco Metal for bushings, bearings, gears, and other vital parts subject to this punishment. Ampco Metal has the *guts* for hard wear and it won't corrode. It gives an extra margin of safety. We can install Ampco Metal parts and forget about them!"

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Ampco Metal is the modern aluminum bronze — characterized by great strength, controlled hardness, corrosion resistance, and superior bearing qualities. Ampco Metal is available in seven grades and several modifications — can be produced by centrifugal or sand casting, extruding, or forging.

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Dept. IA-2, Milwaukee 4, Wis.
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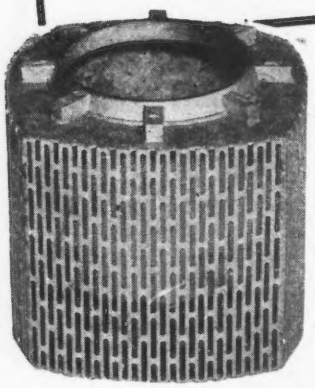

HENDRICK is fully equipped to fabricate a wide range of products from perforated plate, that also involve shaping, forming, welding, riveting, brazing, etc. The pump strainer illustrated is a typical example.

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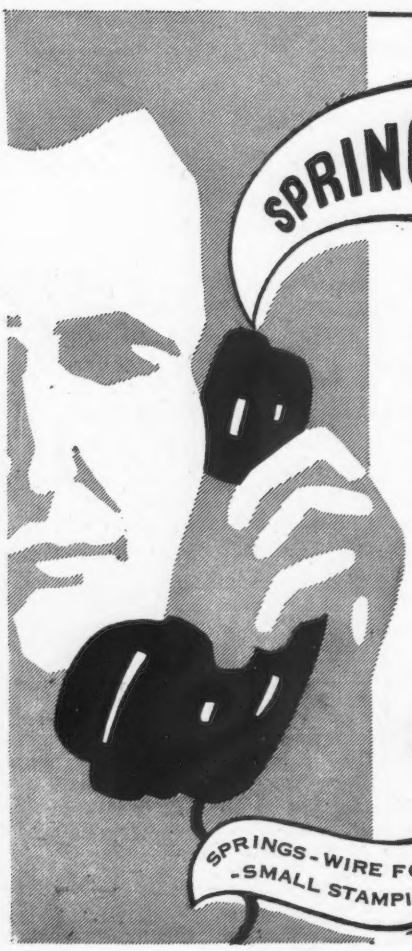

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10,000 TRADE NAMES

Palletier: Electric industrial lift trucks. Crescent Truck Co., 1105 Willow St., Lebanon, Pa.

Palmer-Bee: Conveyor systems for every purpose, steel mill auxiliary equipment, power transmitting machinery, speed reducers and gearing. Palmer-Bee Co., Detroit 12.

Pancake: Steel overfloor raceway systems for wiring for light, power or telephone. Wiremold Co., Hartford 10.

Pandex: X-ray apparatus. Westinghouse Electric Corp., East Pittsburgh, Pa.

Pantal: Corrosion - resistant age - hardening aluminum alloy with Mg-Mn-Si-Ti, for sheet metal and body work. Vereinigte Leichtmetall Werke, G.m.b.H., Hanover-Linden, Germany.

Par: Series of stainless steels and stainless alloys for all heat and corrosion resisting service. Crucible Steel Casting Co., Almira & W. 84th Sts., Cleveland.

Paragon: Blueprint and reproduction equipment. Paragon-Revolute Corp., 93 South Ave., Rochester 4, N. Y.

Paraline: Spring-loaded adjusted automatically motor bases. Allis-Chalmers Mfg. Co., Milwaukee 1.

Paralloy: Alloy iron rolls used for rolling steel shapes in bar mills and alloy iron rolls for coiling machines on strip mills and processing lines. Youngstown Foundry & Machine Co., Parker & Wallace Aves., Youngstown 1.

Paranite: Belting, hose, packing and gaskets. Manhattan Rubber Div., 61 Willett St., Passaic, N. J.

Parasteel: Iron alloy for general use. Paragon Steel & Tool Co., Inc., Rutherford, N. J.

Paratex: Fast-drying, waterproof material made from chlorinated rubber and resistant to ordinary solvents; especially suitable for protecting steel work exposed to salt air. Truscon Laboratories, Inc., Caniff & Plumb Sts., Detroit 11.

Parcalac: Resin coating for Parkerized parts; dipped, then dried at room temperature. Parker Rustproofing Co., 2177 E. Michigan Ave., Detroit, Mich.

Parco-Lubrite: Phosphate lubricating coating which speeds break-in of friction parts, reduces danger of scoring, scuffing and scratching. Parker Rustproof Co., 2177 E. Milwaukee Ave., Detroit 11.

Parkaloy: Cold forging Fe alloy for screws, bolts. Parker-Kalon Corp., 200 Varick St., New York.

Parker-Kalon: Sheet metal screws; self-tapping screws; masonry nails and screwnails. Parker-Kalon Corp., 200 Varick St., New York 14.

Parlon: Chlorinated rubber; used in acid and alkali-proof paints, as black-metal coating replacement for zinc and thin plate. Hercules Powder Co., Wilmington, Del.

Parral: Plastic high-temperature bonding mortar. Robinson Clay Products Co., Akron 9, Ohio.

Parson's Alloy: A 56-42 brass with Fe-Sn-Mn-Al for propeller blades, valve stems, machine parts. American Manganese Bronze Co., Philadelphia.

10,000 TRADE NAMES

Parsons Silver Bronze: Nickel-copper alloy for ship fittings, automobile accessories. Manganese Bronze & Brass Co., Ltd., London, England.

Partex: Foundry mold parting compounds. Independent Foundry Supply Co., 2325 E. 38th St., Los Angeles 11.

Parvis Oil: Lubricating oil for stationary diesel engine. Gulf Oil Corp., Gulf Bldg., Pittsburgh.

Patapar: Parchmentized paper with very high strength; for packaging oiled or greased articles, etc. Paterson Parchment Paper Co., Bristol, Pa.

Patchtite: Plastic fire brick. Robinson Clay Products Co., Akron 9, Ohio.

Patina Steel: Copper-bearing rust-resisting steel for sheet metal structures, roofing, nails, fences. Vereinigte Stahlwerke, Dusseldorf, Germany.

Patternplate: Decorative finish comprising all-over iridescent patterns produced by electrolytic color plating. United Chromium, Inc., 51 E. 42nd St., New York 17.

Patternseal: Coating that forms a protective seal against moisture penetration; permits patterns to be used without a parting compound, seals and coats match plates, coreboxes, etc. Silica Co., 230 La Salle St., Chicago 3.

Paulite: Abrasion-resistant Ni-Cr cast iron for crushers. Simpson Bros., Portsmouth, Ohio.

Pawling Sulphurized: Sulphurized cutting oil, for machining of all metals and especially effective with high-carbon steels. Pawling Refining Corp., Port Chester, N. Y.

P. B. Sillimante: See Sillimante.

PBM: General trade name for aluminum diecastings. Perry Barr Metal Co., Ltd., Handsworth, Birmingham, England.

PMG: Series of copper alloys for screws, rivets, tanks, vats, screw machine products. Phelps Dodge Copper Products Corp., 40 Wall St., New York.

PRK-SH: Self-hardening welding electrode for hardened tool and die steels. Darwin & Milner Inc., 1260 W. 4th St., Cleveland.

PDQC: Heavy, power-driven pipe threading and cutting machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

Peer: Electric resistance (spot) welding machines and electric, weld-timing control equipment. Pier Equipment Mfg. Co., Milton & Cross Sts., Benton Harbor, Mich.

Peerless: Heavy, power-driven pipe threading and cutting machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

Pearless: Tacks. American Steel & Wire Co., Cleveland 13.

Pearlite: Selected hardwood charcoal pack carburizer for pot or rotary furnace processing. Non-burning inorganic binder. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

Pearson: Coated nails. American Steel & Wire Co., Cleveland 13.

Peckrite: Cast iron with Si, Mn, Ni; for bush-

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- EMBOSSING
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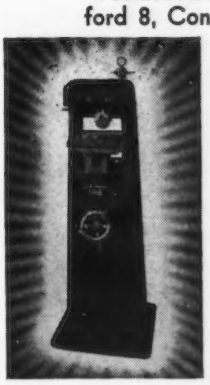

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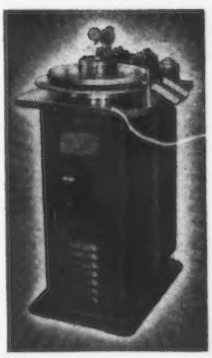

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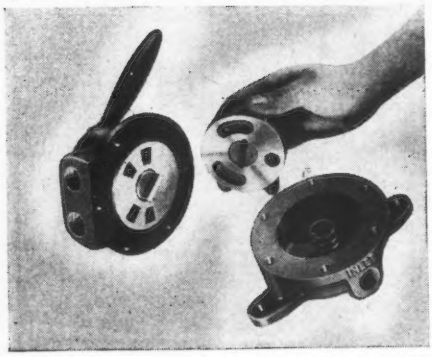

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10,000 TRADE NAMES

Peckovers Ltd., Toronto, Canada.

Peerlac: Firebrick. Laclede-Christy Clay Products Co., Ambassador Bldg., St. Louis 1.

Peerless: Full line of metal-sawing machines, pipe threaders and oil coolants. Peerless Machine Co., Racine, Wis.

Pen-a-Trate: Not an oil, but a solution for breaking rusty joints. Grapho-Metal Packing Co., Indianapolis 5.

Pen-Blue: Layout dye for all metals. Quickly applied and dries instantly ready for scribing. Peninsular Chemical Products Co., Van Dyke, Mich.

Penchlor: Quick-setting, self-hardening cements for all acids except hydrofluoric acid; also fireproof chemical-resisting cements and spark-plug cements. Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

Penco: 0.8 C steel for tools. Peninsular Steel Co., 731 Meldrum Ave., Detroit.

Penco: Steel lockers, steel shelving and cabinets. Penn Metal Corp. of Pennsylvania, Oregon Ave., and Swanson St., Philadelphia 48.

Pendulever: Testing and balancing machines. Tinius Olsen Testing Machine Co., 510 N. 12th St., Philadelphia 23.

Penetrol: Immersion remover of carbon, grease and paint. Turco Products, Inc., Los Angeles 54.

Penetrol: Stops rust on steel without removing the rust; reinforcing reducer for oil paint and enamel and a vehicle for aluminum pigment. Flood Co., 6217 Carnegie Ave., Cleveland 3.

Pen-Kote: Masking lacquers for stopping off in hard chrome, copper, cadmium, tin, zinc and silver electroplating baths. Peninsular Chemical Products Co., 6793 East Nine Mile Road, Van Dyke, Mich.

Pen-Kote 500: Maintenance paint, extremely resistant to acids, alkalis, water, gasoline, oils, alcohol and many solvents. Peninsular Chemical Products Co., Van Dyke, Mich.

Pen-Kote Masking Lacquers: For all selective electroplating cycles; dries rapidly, adheres firmly, and peels readily. Peninsular Chemical Products Co., Van Dyke, Mich.

Pen-Kote Rack Coatings: For insulation of plating racks; completely resist all plating and cleaning solutions. Peninsular Chemical Products Co., Van Dyke, Mich.

Penn Free Flo Bronze Welding Rod: 59-41 brass for welding rods. Titan Metal Mfg. Co., Bellefonte, Pa.

Penn-Optimus Oils: For steam cylinder lubrication. Cities Service Oil Cos., 70 Pine St., New York 5.

Pennaloy: Wear and corrosion-resistant alloys for crusher jaws, cement mills, sand and sludge pumps. Pennsylvania Electric Steel Castings Co., Hamburg, Pa.

Pennpaint: Air-drying, corrosion-resistant organic paint for wood and metal surfaces. Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

10,000 TRADE NAMES

Pennsalt: Complete line of chemicals for tank and electrolytic cleaning of ferrous and nonferrous metals; prior to Bonderizing and Parkerizing; for Bullard-Dunn Process for anodizing, chromatizing and phosphatizing. Emulsion-type cleaners for spray-washing machines where rust inhibition is desired; also paint strippers, pickling inhibitors, and maintenance cleaners. Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

Pennsalt K-7: Cleaner (anhydrous sodium silicate plus additions) developed specifically for electrolytic cleaning and defilming in conjunction with the Bullard-Dunn descaling process. Pennsalt Cleaner Div., Pennsylvania Salt Mfg. Co., 1337 Chestnut St., Philadelphia 7.

Penola: See Penolyn.

Penolyn: Foundry core oils. Penola, Inc., 30 Rockefeller Plaza, New York.

Pen-Tape: Elastic, flexible tape for quick insulation of plating racks and masking of parts before plating. Peninsular Chemical Products Co., Van Dyke, Mich.

Pen-Tube: Tubular insulation for quick protection of plating rack contact wires. Peninsular Chemical Products Co., Van Dyke, Mich.

Pensy: High-heat-duty fire brick. Quigley Co., Inc., 527 Fifth Ave., New York 17.

Per-ex: Perchlorethylene for vapor degreasing of metals. Detrex Corp., 14333 Woodrow Wilson Ave.. Detroit.

Peraluman: Corrosion-resistant aluminum alloy with Mg-Mn, for panelling in architecture, ship building, automobile parts. Aluminium Industrie A. G., Neuhausen, Switzerland.

Perchlorethylene: Vapor degreasing solvent. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Percipitiron: Electronic air cleaner. Westinghouse Electric Corp., E. Pittsburgh.

Perclene: Vapor degreasing solvent. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Perbunan: Mechanical elastomer like Neoprene. Standard Oil of Louisiana, Baton Rouge, La.

Perduro: Copper-bearing, heat-treated malleable iron; high strength, corrosion and abrasion resistant; used for chain links, sprockets, etc. Jeffrey Mfg. Co., Columbus 16, Ohio.

Perfect: All types of oil seals. Chicago Rawhide Mfg. Co., 1303 Elston Ave., Chicago 22.

Perfect: Flooring brads and roofing nails. Bethlehem Steel Co., Bethlehem.

Perfect 36: Vertical turret mills for boring, drilling, turning and threading ferrous and nonferrous castings and forgings. Rogers Machine Works, Inc., 1807 Elmwood Ave., Buffalo 7.

Perfected: Piano wire; plaster and stucco, reinforcement; guard rail cable. American Steel & Wire Co., Cleveland 13.

Perfection Antifriction: Bearing for babbitt. National Lead Co., 111 Broadway, New York.

Perfection: Door and gate springs. American Steel & Wire Co., Cleveland 13.

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Perfection: Welding electrodes and steel rivets. Anthony Carlin Co., 2717 E. 75th St., Cleveland.

Perlton: Cyanide-containing salts for imparting uniform carburizer case up to 0.070 in. Used in the carburizing range up to 1750°F. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

Permabrite: Austenitic stainless steel for heavy corrosive stresses. J. J. Saville & Co., Ltd., Sheffield, England.

Permacast: Permanent-mold castings in light metals. Permacast Div. of Manhattan Modeling & Chasing Co., Paterson, N. J.

Perm-A-Clor: Stabilized trichlorethylene for solvent vapor degreasing of metals between fabricating operations and before painting, plating, etc. Detrex Corp., 14333 Woodrow Wilson Ave., Detroit.

Permag: Metal cleaning compounds. Magnuson Products Corp., 50 Court St., Brooklyn 2.

Permag No. 266: Electrolytic steel cleaner; 6 to 8 oz per gal of water is required. Magnusen Products Corp., 50-52 Court St., Brooklyn 2.

Permal: Diecasting alloy. Perry Barr Metal Co., Ltd., Birmingham, England.

Permanente 80 Basic Bonding Mortar: For bonding basic or chrome refractories. Permanente Products Co., Permanente, Cal.

Permanente Chrome Periclase Brick: A chrome-magnesia refractory particularly suitable for installation next to silica, alumina or fireclay brick. Permanente Products Co., Permanente, Cal.

Permanente Deadburn Dolomite: A maintenance grade refractory for basic electric and openhearth bottoms and side walls. Permanente Products Co., Permanente, Cal.

Permanente Ferrosilicon: Available in all standard sizes and grades, including briquettes. Permanente Products Co., Permanente, Cal.

Permanente Periclase Brick: A chemically-bonded magnesia refractory brick. Permanente Products Co., Permanente, Cal.

Permanente 84 Periclase Ramming Material: A ramming mix for construction of new basic furnace bottoms or cold patching of same. Permanente Products Co., Permanente, Cal.

Permanite: Copper-alloy castings. Lorain Brass Co., Lorain, Ohio.

Permanite: White base metal. Metals & Controls Corp., Forest Ave., Attleboro, Mass.

Permant Steel: 35 Ni iron alloy for scientific instruments, scales, clocks. Thos. Firth & John Brown, Ltd., Sheffield, England.

Permex: High permeability iron-nickel alloys for electrical equipment. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France.

Perm-Brite: Aluminum alloy. Apex Smelting Co., 2517 W. Taylor St., Chicago 12, Ill.

Permendur: Cobalt-vanadium core material. For use at very high densities. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22.

Permendur: 50-50 iron cobalt alloy for electrical apparatus working at high flux density. Bell Telephone Laboratories, 465 West St., New York.

Permi-Bond: Foundry core and facing binder. Independent Foundry Supply Co., 2325 E. 38th St., Los Angeles 11.

Perminvar: Ni alloy with 25 Co, 30 Fe for electric communication circuits. Bell Telephone Laboratories, 465 West St., New York.

Permite: Series of aluminum alloys with Cu-Si-Mg-Fe or Mg-Zn-Si; for piston, permanent-mold castings, pumps. Aluminum Industries Inc., Keller & Beekman Sts., Cincinnati.

Permite: Aluminum permanent-mold, sand and diecastings; forged steel parts; ready-mixed aluminum paints. Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25.

Permite: Bronze for general use. Joseph T. Ryerson & Son, Inc., 2558 W. 16th St., Chicago.

Permite: Permanent-mold aluminum-alloy castings. Aluminum Industries, Inc., Beekman St., Cincinnati 25.

Permo: Corrosion and wear-resistant Os-Rh-Ru alloy for instrument bearings fountain pen tips. Permo Products Corp., 6415 N. Ravenswood Ave., Chicago.

Permold: Aluminum alloy for washing machine and typewriter parts. Permold Co., Medina, Ohio.

Permometal: Wear and corrosion-resistant alloy used for intrument pivots. Permo Products Corp., 6415 N. Ravenswood Ave., Chicago.

Permutit: Water conditioning equipment. Permutit Co., 332 W. 42nd St., New York.

Peroline: Combined chemical and oil that removes light rust and rusters and effectively prevents rust during storage, fabrication, or transit. American Chemical Paint Co., Ambler, Pa.

Petite Iron: Cr-Ni-V alloy iron for cams, forming and spinning rolls, machine slides. Crucible Steel Casting Co., Almira & W. 84th St., Cleveland.

Petroflo: Holds the heavy sludge-forming hydrocarbons of fuel oil in suspension, assuring a clean system to provide a steady, free flow of oil, resulting in better atomization with a soft even flame. Xzit Sales Co., 1029 Clinton St., Hoboken, N. J.

Pexto: Mechanics' hand tools and machines for sheetmetal fabrication. Peck, Stow & Wilcox Co., Southington, Conn.

Phenix: Iron with 25 Ni for resistances and rheostats. International Nickel Co., Inc., 67 Wall St., New York.

Pheoll: Recessed-head screws. Pheoll Mfg. Co., 5700 Roosevelt Road., Chicago 50.

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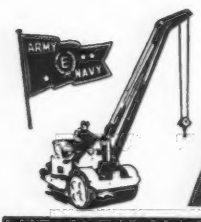

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10,000 TRADE NAMES

Philo Brand: Series of ferrosilicon alloys for metallurgical applications. Ohio Ferro Alloys Corp., Canton, Ohio.

Phillips: Recessed head screws. Pheoll Mfg. Co., 5700 Roosvelt Road, Chicago 50.

Phillsolv: Vapor degreasing solvent. Phillips Mfg. Co., 3434 W. Touhy Ave., Chicago 45.

Phoenix: Free-cutting steel for screws, bolts, nuts. United Steel Companies, Ltd., Sheffield, England.

Phoenix: Forgings and forging hammers. Phoenix Mfg. Co., Joliet, Ill.

Phoenix Metal: Lead alloy used for bearings. National Lead Co., 111 Broadway, New York.

Phoenixloy: Alloy cast iron with 5 Ni-Cr; for heavy-duty mill rolls. International Nickel Co., Inc., 73 Wall St., New York.

Phosnic: High-copper age-hardenable alloy combining high strength and high electrical and thermal conductivity in an unusual degree. Chase Brass & Copper Co., Waterbury 91, Conn.

Phono Bronze: 1.25 Sn-0.008 Fe bronze for trolley wires, hardware. Bridgeport Brass Co., Bridgeport, Conn.

Phono Electric Bronze: Bronze with 1.4 Sn for trolley wire, hardware. Bridgeport Brass Co., Bridgeport, Conn.

Phos-Copper: Welding rods. Westinghouse Electric Corp., East Pittsburgh, Pa.

Phos-Trode: Shielded metallic-arc dc phosphor-bronze electrode for high-speed quality welding of bronzes, brasses, copper, steel cast and malleable iron in all positions. Ampco Metal, Inc., Milwaukee 4.

Phosphatizing: Treatment to impart thin, inert phosphate coating to ferrous and nonferrous metals to prepare surface for painting. Parker Rust-Proof Co., 2171 E. Milwaukee Ave., Detroit.

Photo-Troller: Electronic controllers. Westinghouse Electric Corp., East Pittsburgh, Pa.

Photox: Photocells. Westinghouse Electric Corp., East Pittsburgh, Pa.

Pickelene: Metal pickling composition. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Pickleen: Liquid wetting and penetrating agent for sulfuric or hydrochloric acid pickling solutions prior to hot galvanizing, hot tinning, rust-proofing, painting, etc. Enthone Co., 452 Elm St., New Haven 2, Conn.

Pickle Bath Toners: For use in pickling baths either with or without Rodine to improve the finish and pickling of work that is slightly oily. Reduces dragout of pickling solution. American Chemical Paint Co., Ambler, Pa.

Pickle Bath Toners: For use in pickling baths either with or without Rodine to improve the finish and pickling of work that is slightly oily; improves electrolytic pickling. American Chemical Paint Co., Ambler, Pa.

Pier: Electric, resistance (spot) welding machines and electric, weld-timing control equipment. Pier Equipment Mfg. Co., Milton & Cross Sts., Benton Harbor, Mich.

Pilot: Full line of fractional horsepower ac

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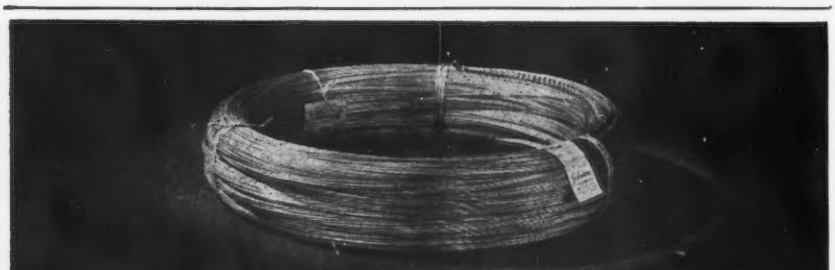

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(To be Continued Next Week)